USE OF AND INFORMATION SEEKING BEHAVIORS ON FACEBOOK AMONG ILLINOIS FARMERS AND FARM FAMILIES

BY

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DISSERTATION

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ABSTRACT

To what extent are farmers in Illinois using the social networking platform Facebook and for what purpose? Do they use it to seek information related to farming? If so, what types of farming-related information are they looking for? This study aims to examine farmers' acceptance, use of, and information seeking behaviors as they engage with others through Facebook.

This study makes use of the modified propositions of the Unified Theory of Acceptance and Use of Technology (UTAUT) model to determine farmers' acceptance and use of Facebook. To ascertain information seeking behaviors, the tenets of the Comprehensive Model of Information Seeking (CMIS) was applied. The precepts of the Uses and Gratifications Theory (U&G) were used to determine the gratifications they sought and obtained through Facebook.

This study applied a mixed methods approach to gather and analyze data. First, a survey of Illinois County Farm Bureau members and followers, as well as Illinois County Extension members and followers, was conducted to gauge acceptance and use, information seeking behaviors, and gratifications sought and obtained on Facebook. Survey data were analyzed using the Kaiser-Meyer-Olkin (KMO) test, principal component analysis (PCA), Cronbach's alpha, and multiple linear regression tests.

Second, a content analysis of texts on public and group Facebook pages identified by survey respondents was conducted to understand the types of information users seek. Two undergraduate students were recruited to "scrape" text from the pages and perform coding. Qualitative coding was performed by placing mined text into one of eleven pre-determined domains based on the topic spread in the public and group pages. The coding language R, its library *tidytext,* and its dependencies were used to process, analyze, and visualize the texts.

Regression results indicate that those who are more accepting of the technology, those who see Facebook as a rich medium of communication, and those who have significant personal relationships online have a higher propensity to use this social media platform. Those with little experience with it are likely to eschew Facebook use. These results provide evidence that the UTAUT items the present study added to the original proposition—perceived media richness and perceived personal network—enhanced the usability and validity of the model.

Examining information seeking patterns through a content analysis of public and group Facebook pages showed that animals, finance, and crops were the major domains about which information were sought by Facebook users. Important sub-areas within these domains also were identified. Beliefs and channel characteristics contributed positively to the perceived channel utility of Facebook among the respondents. Salience had a negative effect on perceived utility as respondents' increased need for information went in tandem with a certain level of skepticism about Facebook's ability to provide that information. Statistical analyses uncovered positive and strong relationships between gratifications sought and gratifications obtained items. Results suggest that the farming population seek and obtain gratifications from Facebook beyond those that are related to strictly figuring out how to solve problems in the farming enterprise.

Many studies have previously examined people's motivations for using different information technologies. This study contributes to the theoretical and methodological base by testing the applicability of the modified UTAUT and CMIS models in determining acceptance and use of Facebook in the agriculture domain. The findings are expected to assist policy makers, communication practitioners, and knowledge managers in developing strategies and policies that aim to expand farmers' engagement in local and national dialogues about topics and issues that affect their livelihood, their communities, and the agriculture industry.

ACKNOWLEDGEMENTS

I would like to thank my committee members – Dr. Lulu Rodriguez, Dr. Matthew Turk, Dr. Matthew Hudson, and Dr. Stephen Moose for their support and guidance through this process. I would like to thank the two students who assisted me by scraping and coding text data – Ananth and Mahiro. Finally, I would also like to thank my family and friends for their support and encouragement.

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CHAPTER 1: INTRODUCTION AND RATIONALE FOR THE STUDY

In the 1700s, "word of mouth and limited print sources were the only means of communication" in the American agricultural landscape (Doerfert & Miller, 2006, p. 19). Today, even rural residents have a suite of information and communication technologies at their disposal—cellular phones, computers, computerized machinery, fiber optics, communication satellites, the Internet, and other integrated telecommunication technologies. This led Doerfert and Miller (2006) to state that "the communications network among agriculturalists has been enhanced, and the agribusiness sector has utilized these new innovations to improve production and marketing" (p. 20). The current state of information infrastructure and digital resources in the service of rural areas in the United States has allowed the almost instant exchange of information, contributing substantially to the agriculture industry's progress and increased visibility (Doerfert & Miller, 2006).

While television, magazines, newspapers, and radio remain the dominant mass media channels in the agriculture milieu, digital forms of communication are quickly gaining ground. According to a 2017 USDA report, of the 2,048,000 farms in the nation, 71% have Internet access, 73% have access to computers which they own or lease, 47% use those computers for farm business, and 39% use a smartphone or tablet for their farm operations. The USDA (2017) defines a farm as "any place from which $1,000 or more of agricultural products were produced and sold, or normally would have been sold, during the year" (p. 28). Internet access has increased in tandem with rising farm incomes. Among farms that fall under the $1,000 to $9,999 annual income category, 33% use the Internet, and 29% use a tablet or smartphone for farming. These figures moved to 49% and 40%, respectively, among those with

annual incomes of $10,000 to $99,999. Among those who earn $100,000 or more, 71% go online to get information about farming operations; 59% have tablets and smartphones at their disposal (USDA, 2017).

Of the 71,000 farm operations in the state of Illinois, 79% use computers, almost all of which have Internet access, according to the USDA (2017). Of these, 59% conduct farm business using computers while 53% employ a smartphone or tablet (USDA, 2017). Internet use among Illinois farmers is higher compared to national figures. Based on USDA (2017) data, 24% of the state's farm operators say they purchase agricultural inputs over the Internet (23% for the U.S.), 25% conduct agricultural marketing activities over the Internet (18% for the U.S.), and 54% do business through non-agricultural websites (44% for the U.S.). With over half of Illinois farms spending time on non-agricultural websites, it is safe to assume that computer time is being allocated for social media consumption.

The term "social media" includes applications such as YouTube, Facebook, and Instagram, in which people connect and share content with others. The Pew Research Center, which monitors Americans' social media use, reports that in 2018, the top five social media applications are YouTube (73%), Facebook (68%), Instagram (35%), Pinterest (29%), and Snapchat (27%) (Smith & Anderson, 2018). In rural communities, the top five social media platforms, also according to Smith and Anderson (2018), are YouTube (59%), Facebook (58%), Pinterest (28%), Instagram (25%), and Snapchat (18%), in that order. These findings were based on the responses of 2,002 American adults 18 or older who responded to a national survey conducted January 3-10, 2018. The results represent a huge increase compared to data gathered in 2005, when Perrin (2015) reported that only 7% of adults used a social networking site.

As in any other sector, social media use in agriculture is on the rise. Shaw, Meyers, Irlbeck, Doerfert, Abrams, and Morgan (2015), who surveyed 185 U.S. farmers, found that Facebook (54.7%), YouTube (40.5%), and Twitter (16.1%) were the most used platforms on a monthly basis.

Another national study by the Agri Media Committee (2018) reported that of the 3,523 farmers and farm managers they surveyed, 8% used agricultural social media daily, 8% accessed it weekly, 6% used it monthly, and 12% used it less frequently than monthly. A good 53% said they never touched social media at all. The percentage of social media users is higher in the Midwest, where 28% of the study's 1,542 respondents reportedly used agricultural social media at least monthly. Asked to pick their top two sources of information about agricultural products, 4% selected agricultural social media. At any stage of decision-making regarding what agricultural products to purchase, agricultural social media was used 21% of the time. Another 23% said they use social media to keep up with agricultural news and trends. Among Midwest farmers, 30% did the same (Agri Media Committee, 2018).

It is important to note that the Agri Media sample is skewed toward more senior respondents (41% were 65 or over; 38% were 50-64 years old), which may have had a bearing on the findings considering that younger people have been known to be more avid social media users. Facebook, however, reports that its fastest growing age demographic is people over 55 (Walter, 2017). A national survey conducted by the Pew Research Center showed that 88% of those who were 18-29 and 78% of those who were 30-49 use a social media platform (Smith & Anderson, 2018). Similarly, 14% of the respondents in the 2018 Agri Media study who were 45 years old or younger demonstrated the highest agricultural social media use of any age group.

Across the globe, farmers are taking advantage of social media for agriculture purposes. In Nigeria, Ajayi's (2015) sample of agro-entrepreneurs (N=360), indicated that many use Facebook (21%), WhatsApp (15%), and LinkedIn (12%). Alabi, Onifade, and Sokoya (2013) surveyed agricultural researchers (N=101) also in Nigeria, and found Facebook (41.4%), LinkedIn (18.3%), and Google+ (11%) as the most popular social media platforms. In Uganda, Byomire, Namisango, and Kafuko (2016) surveyed 109 urban agriculturists and found WhatsApp (89%), Facebook (82.6%), and YouTube (19.3%) as the most preferred social media outlets. These studies suggest the dominance of Facebook as a social media platform of those engaged in agriculture in many parts of the world.

Undoubtedly, an increasing number of those in the agriculture sphere have been using social media, but exactly what are they being used for? Are they using them in the same way as the general population, which is to mainly stay connected with friends and family and for their entertainment value? Or are they using these channels to obtain general news and information that can help them improve their farming operations? Suchiradipta and Saravanan (2016), conducting a global agriculture extension survey, found that of their 229 respondents, 75.7% used social media to find information related to agriculture. Those they surveyed said they did so because it was "part of their job" (55.6%) and it "satisfied personal interests" (72.7%). Byomire, Namisango, and Kafuko (2016) found that urban agriculturists used social media to sell (89.0%) and buy (77.1%) produce, for marketing purposes (76.1%), and to access climate information (49.5%). Ajayi (2015) observed that 61% of the agro-entrepreneurs he studied used social media for various agribusiness purposes such as price monitoring and networking.

To what extent do farmers use social media to find and retrieve agriculture and related information so that they are able to perform their tasks better? The recent wave of literature

documents the current and projected benefits that can be derived from social media use. Ajayi (2015), for example, states that social media use has "enabled both small and large scale agro-entrepreneurs [to] communicate their products more effectively to their consumers," ensuring "rapid consumer feedback to improve and adjust to global best practices" (p. 20). Alabi, Onifade, and Sokoya (2013) observed that by using social media, scientists were able to "find a mentor," "be exposed to the latest knowledge, skills, and technology," "connect with other agricultural researchers with similar research interest," and "[find] the right methodology for my research" (p. 7).

Research Questions

This study asks the following research questions:

RQ1: What factors lead to the acceptance and adoption of Facebook among farmers?

RQ2: What do farmers use Facebook for and to what extent do they use it to seek information about their farming enterprise?

RQ3: What needs are answered and what gratifications are derived from farmers' use of Facebook?

Study Contributions

Clearly, more and more farmers and farm communities are actively engaging in social media platforms for both personal and business reasons. By studying how farm constituents use social media to assist in the performance of their tasks, policy makers and communication strategists can arrive at ways of reaching out to this important audience group, and to target users in specific areas. By expanding their access to all sorts of information sources, farmers and

farming communities are able to independently find solutions to their problems without expending too much time and energy.

For communication specialists, the findings of this study are expected to assist in formulating strategies that will enhance rural engagement. What is the simplest and most efficient way to create conversations with like-minded individuals, companies, groups, and organizations on social media? Are there relevant hashtags farmers can employ to join online conversations? How can the relevance of research findings and new practices be enhanced through farmers' interactions on Facebook?

Among marketers, understanding how those in agriculture businesses are using platforms like Facebook can enable their brand to deliver useful content at the right moment. What types of content engage farming audiences more? What combination of message formats could guarantee audience response? Should videos be used to convince farmers that they need to visit specific websites to get the information they require? Zipper (2018) observed that examining Twitter data enabled the monitoring of national and local agricultural problems in real time, which is an added benefit of pursuing explorations of this kind.

This study adds to the body of knowledge by determining the factors that influence the adoption and use of social media as a relatively new information-communication technology application in the agriculture domain. Farmers, farm families, and farming communities, in general, constitute a relatively under-studied group. Knowing the types of information they seek and the ways by which they use Facebook as a mechanism to satisfy the information gaps they experience will be beneficial to those who create policies and draw communication strategies to bring them into the mainstream discussion of topics and issues that affect their lives.

There are two novel aspects of this study. First, it tests the applicability of a modified UTAUT model and the CMIS model in pinpointing the factors that influence the use of a new information technology in the agriculture sphere. Second, the findings of this study expand our understanding of the types of information and content farmers seek, and how they use Facebook as a mechanism to fill perceived information needs.

CHAPTER 2: LITERATURE REVIEW AND CONCEPTUAL FRAMEWORKS

Social Media and Social Networking Sites: An Overview

The terms "social media" and "social networking site (SNS)" are often used interchangeably. However, these two terms are different. "Social media" is the more overarching term. Kaplan and Haenlein (2010) defined it broadly as "a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allows the creation and exchange of user-generated content" (p. 61). Web 2.0, a term first used in 2004, refers to the modifications Internet users can perform on websites to make the Internet itself more interactive. Its earlier version, Web 1.0, displayed mostly static webpages (Kaplan & Haenlein, 2010). "User-generated/user-created content," a term popularized in 2005, refers to the creation and distribution of content in a publicly accessible online space (Wunsch-Vincent & Vickery, 2007). SNSs fall under this definition. Kaplan and Haenlein (2010) also considered virtual worlds and games like Second Life® and World of Warcraft® as social media.

"Social network sites," on the other hand, are "web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system" (boyd & Ellison, 2008, p. 211). Examples of SNSs are Facebook, LinkedIn, online collaboration sites such as Wikipedia, photo sharing sites like Instagram, and video sharing sites like YouTube. An exhaustive list of social media platforms and the timeline of their market launch are shown in Figure 1.

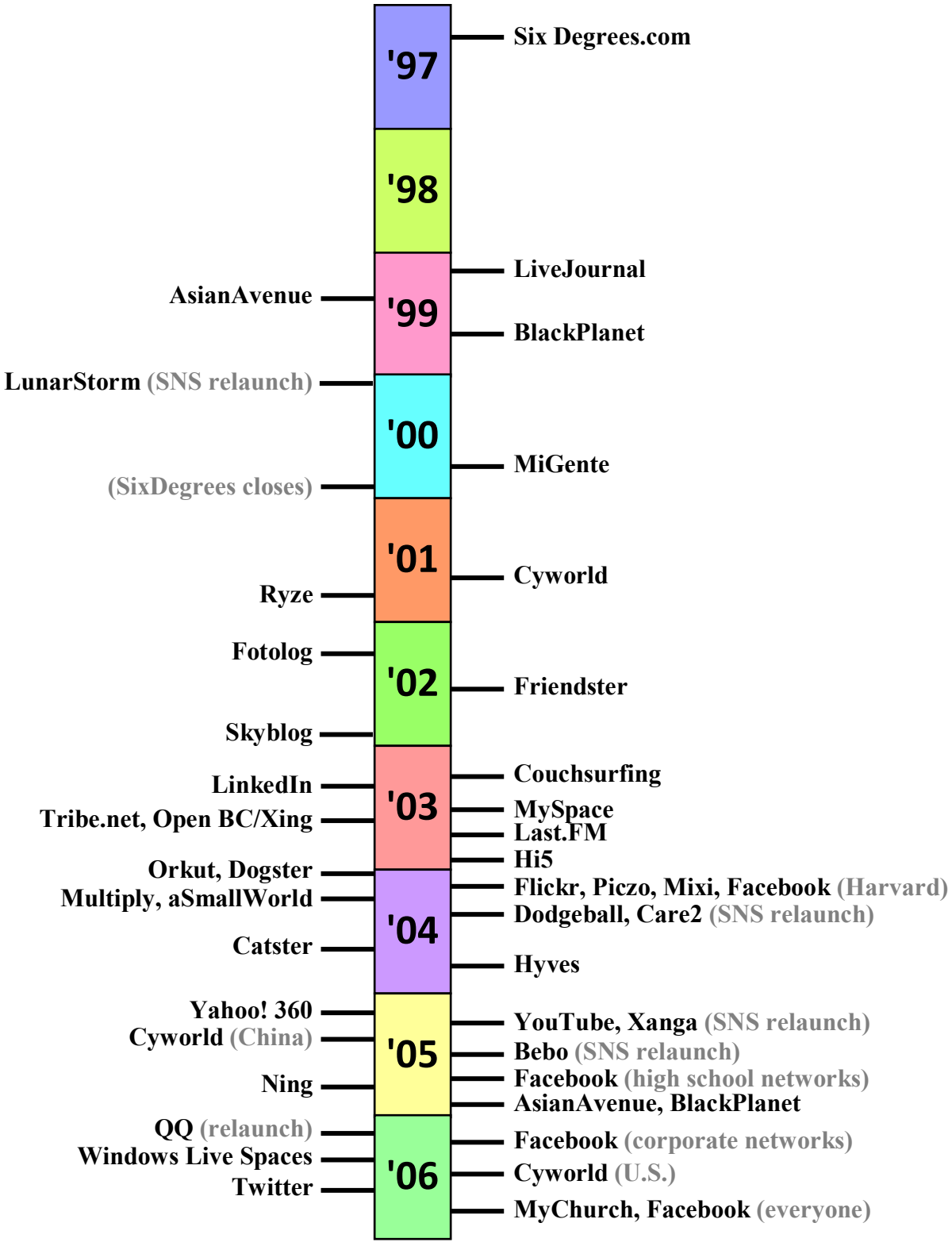

Figure 1: Social media platforms and their launch timeline adapted from boyd and Ellison (2008), "Social network sites: Definition, history, and scholarship"

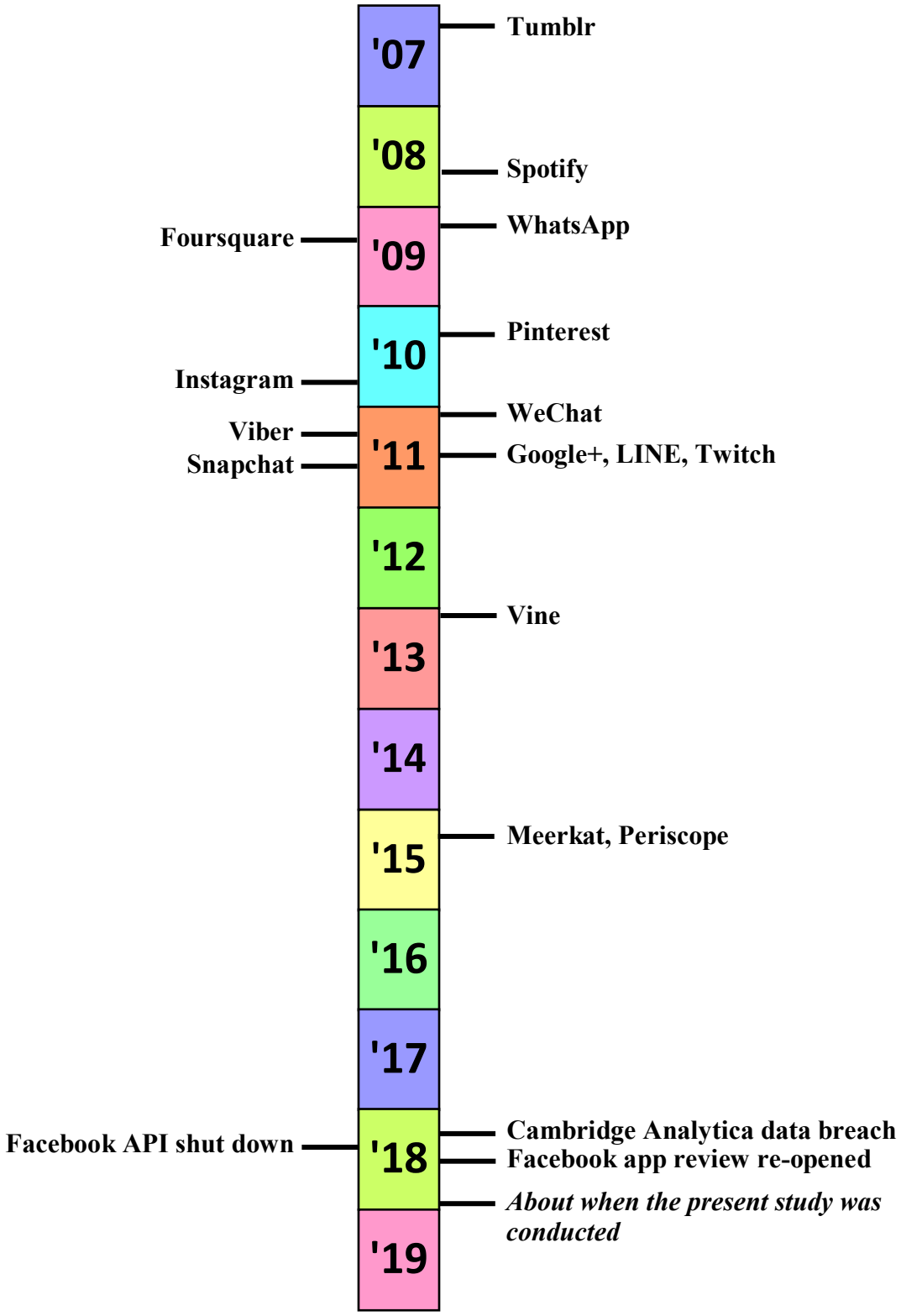

Figure 1 (cont.)

SNSs have various features such as private messaging and the ability to comment on profiles and share photos or videos (boyd & Ellison, 2008). boyd and Ellison (2008) emphasized that SNSs allow interactions between and among connected individuals and groups, and enable users to see other people's connections.

This study focuses on the use of a specific SNS, Facebook. As of March 2018, it had 1.45 billion daily active users on average, and 2.2 billion monthly active users (Facebook Newsroom, 2018, para. 1). This makes it the largest social media platform in the world, ahead of YouTube, which has approximately 1.5 billion monthly active users (Statista, 2018).

Facebook is also the leading social media platform in the agriculture community, according to Shaw et al. (2015), Ajayi (2015), and Alabi, Onifade, and Sokoya (2013). The latter study showed that 41.4% of the agricultural researchers they studied (N=101) use it. Byomire, Namisango, and Kafuko (2016) found that 82.6% of urban agriculturalists (N=109) also subscribe to Facebook.

The public can also use Facebook's application program interface (API), called the Graph API, to mine data from the platform such as page and group content (Facebook for Developers, 2018b). Until April of 2018, this API was available for anyone to use (Gonzalez, 2018). In March of 2018, Facebook made news headlines when it was discovered the political consulting firm, Cambridge Analytica, had abused Facebook users' information privacy (Bump, 2018). Because of this, apps accessing user data was severely restricted shortly thereafter. As of May 2018, Facebook re-opened its app review function, which requires an approval process for anyone who wishes to use any of its APIs (Facebook for Developers, 2018a). This allows researchers to gather qualitative data to examine what users have posted on the site. The timeline of events is included in Figure 1 along with this study's survey release time.

The current study's first research question asks: What factors lead to the acceptance and adoption of Facebook among farmers? This study applies a modified version of the Unified Theory of Acceptance and Use of Technology (UTAUT) model, developed by Venkatesh, Morris, Davis, and Davis (2003), to answer this research question. The model is diagrammed in Figure 2.

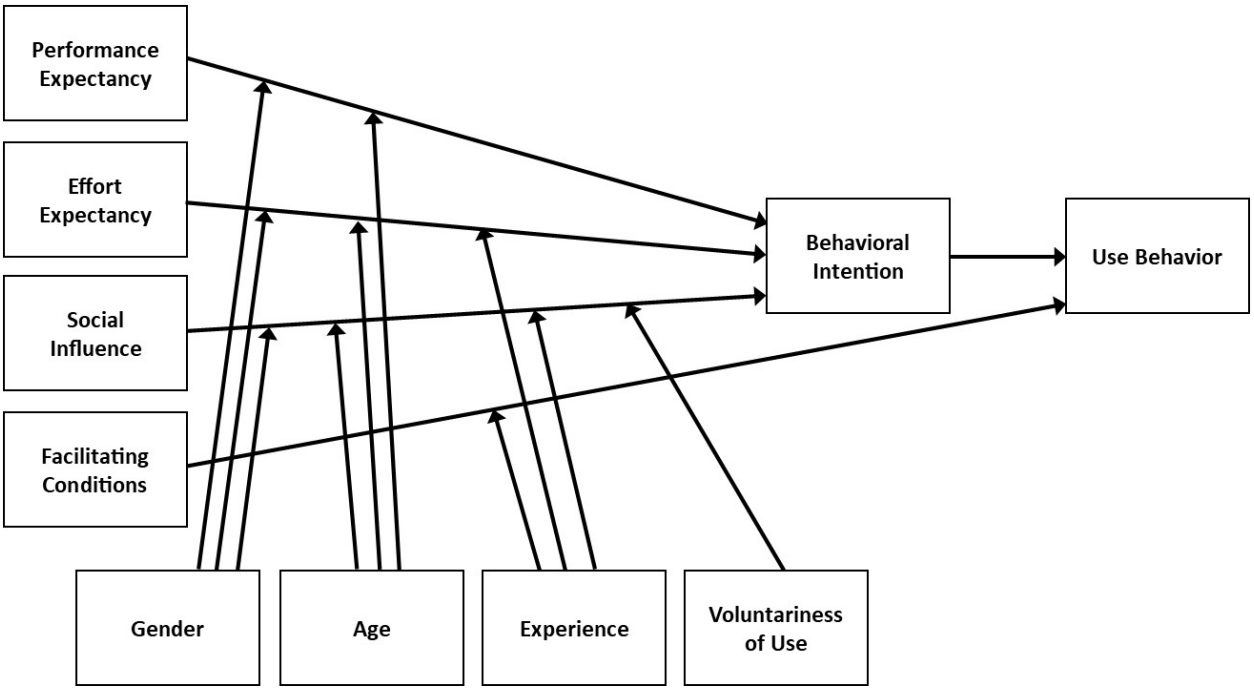

Figure 2: The original UTAUT model adapted from Venkatesh et al. (2003), "User acceptance of information technology: Toward a unified view"

The Unified Theory of Acceptance and Use of Technology (UTAUT) Model

The UTAUT model is designed to help people "understand the drivers of acceptance to proactively design interventions (e.g., training and marketing) targeted at populations of users that may be less inclined to adopt and use new systems" (p. 426). According to this model, several factors influence the acceptance and use of a technology. How people react to technology use predicts their intention to use that technology, leading to actual use. How they use the

technology, in turn, re-shapes their reactions to technology use. Acceptance of the technology, in this case, is measured by determining intention to use it. To measure behavioral intention, survey respondents are asked how receptive they are to the technology and if they plan to use it. Then, they are asked how they use the technology, which is equivalent to use behavior in the model.

According to Venkatesh et al. (2003), UTAUT was formed from eight discrete theories and models. These are the Theory of Reasoned Action (TRA by Fishbein & Ajzen, 1975), Technology Acceptance Model (TAM by Davis, 1985), Motivational Model (MM by Davis, Bagozzi, & Warshaw, 1992), Theory of Planned Behavior (TPB by Taylor & Todd, 1995b), the combined TAM and TPB Model (C-TAM-TPB by Taylor & Todd, 1995a), the Model of PC Utilization (MPCU by Thompson, Higgins, & Howell, 1991), Innovation Diffusion Theory (IDT by Rogers, 2003; Moore & Benbasat, 1991), and Social Cognitive Theory (SCT by Bandura, 1986; Compeau & Higgins 1995).

The Theory of Reasoned Action (TRA) focuses on how people's beliefs influence their attitude toward a behavior and the subjective norm surrounding the behavior, which in turn predicts behavioral intent and subsequent action. There is then a feedback loop from behavioral action to one's beliefs. TRA's core constructs include beliefs or information a person has regarding the behaviors, attitude toward the behavior or how a person feels about performing a behavior, and subjective norm or how perceived societal expectations affect a person's motivation to perform a behavior (Fishbein & Ajzen, 1975).

The Technology Acceptance Model (TAM), introduced by Fred Davis in 1985, states that a user's actual system use can be predicted by his/her attitude toward using the system, which in turn is determined by the perceived usefulness and the perceived ease of using that system. The model was designed to predict the acceptance and use of information systems and technologies

in job settings. TAM's core constructs include attitude or how an individual thinks and feels about the system, perceived usefulness or how much an individual thinks a system would make him/her perform better on the job, and perceived ease of use or how easy an individual thinks the system would be to use (Davis, 1985). Davis (1985) found usefulness to be "2.65 times as important as ease of use in determining self-predicted system usage" (p. 173).

The Motivational Model (MM) was used by Davis, Bagozzi, and Warshaw (1992) to test extrinsic and intrinsic motivations behind computer use in the workplace. This model posits that usefulness and enjoyment mediate the effects of perceived output quality and perceived ease of use on use intentions. The core constructs of this model include extrinsic motivation, which refers to a valued outcome such as perceived usefulness as an impetus for performing an activity, and intrinsic motivation, which refers to individuals' propensity to perform an activity for the sake of performing it, such as enjoyment. Davis et al. (1992) found usefulness to be four to five times more influential than enjoyment in determining intention to use a computer.

The Theory of Planned Behavior (TPB) is an extension of Fishbein and Ajzen's Theory of Reasoned Action, which was intended "to account for conditions where individuals do not have complete control over their behavior" (Taylor & Todd, 1995b, p. 149). TPB's core constructs include attitude toward the behavior, subjective norms, and perceived behavioral control, which is affected by the constraints an individual perceives in performing a recommended behavior (Taylor & Todd, 1995b).

Comparing TAM, TPB, and a decomposed version of TPB (DTPB), which individually considers the antecedents to attitude, subjective norm, and perceived behavioral control, Taylor and Todd (1995b) found that TPB does not provide an advantage over TAM in predicting intent and use. They also observed that DTPB is better suited for understanding the subtleties behind

behavioral intention, and thus possibly providing "more guidance to IT managers and researchers interested in the study of systems implementation" (p. 170).

In their combined version of TAM and TPB (C-TAM-TPB), also referred to as augmented TAM, Taylor and Todd (1995a) added subjective norms as a predictor of behavioral intention, and perceived behavioral control as a predictor of behavioral intention and use. The combined model's core constructs include perceived usefulness, ease of use, attitude, subjective norms, and perceived behavioral control. Taylor and Todd (1995a) found attitude as a non-significant predictor of intention, but the model could be used to predict use regardless of how much experience a person has had with the system.

The Model of PC Utilization (MPCU) was proposed by Thompson, Higgins, and Howell (1991) to help predict the use of personal computers using a range of attitudes and behaviors. The model, however, does not consider behavioral intention. MPCU's core constructs include "job fit" or how much an individual thinks his/her job performance will increase with PC use, complexity or an individual's perceptions of how difficult a system is to understand and use, long-term consequences or the outcomes an individual feels will occur if one were to use the system, affect toward use or feelings associated with doing an act, social factors or how individuals are influenced by what how others feel, and facilitating conditions or the amount of support an environment has for PC use such as the availability of training opportunities (Thompson, Higgins, & Howell, 1991). Thompson, Higgins, and Howell (1991) found social factors and use, as well as job fit and use, to be positively and significantly related. Affect toward use did not significantly predict use.

Diffusion of Innovations posits that five characteristics of an innovation affect the rate by which the innovation diffuses through a social system. These are relative advantage or how much

an individual thinks the innovation is better than the one that precedes it, compatibility or how consistent an innovation is with social norms, the complexity of the innovation, trialability or the ability of the innovation to be used on a trial basis, and observability or the extent by which the results of applying the innovation are witnessed by others (Rogers, 1983). Moore and Benbasat (1991) added some of their own constructs to the original proposition and developed an instrument to test a technology's rate of diffusion. The instrument's core constructs include voluntariness or the degree of freedom an individual has in choosing to use the innovation, image or the ability of an innovation to increase social status, visibility or the extent to which someone can empirically witness the benefits of an innovation, result demonstrability or how tangible an innovation's results are, relative advantage or how improved an innovation is over a competing option or the previous generation of a product, the level of compatibility that an innovation has with individuals as they assimilate it into their lives, ease of use, and trialability or how easily potential adopters can explore the innovation (Moore & Benbasat, 1991). Their results showed all constructs to have high reliability, with alpha coefficients ranging from 0.71 to 0.90.

Bandura (1986), who proposed Social Cognitive Theory (SCT), posited that "people are neither driven by inner forces nor automatically shaped and controlled by external stimuli" (p. 18) when they decide to use a technology. Instead, he argued that behavior, cognitive factors, and environmental events all interact in a method of triadic reciprocality. SCT has six main constructs: reciprocal determinism or the notion that behavior is influenced by cognitive and environmental factors, behavioral capability or the skills one has in order to perform a behavior, observational learning which occurs by watching others, reinforcements or the idea of responding to one's behavior in a way that affects the repetition of that behavior, expectations or what one thinks will happen after doing a behavior, and self-efficacy (Bandura, 1986). The

construct of self-efficacy used in the original formulation of UTAUT (specifically, perceived self-efficacy), is defined as "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances. It is not concerned with the skills one has, but with judgements of what one can do with whatever skills one possesses" (Bandura, 1986, p. 391).

Compeau and Higgins (1995) developed a measure to specifically test self-efficacy with computers, and adapted parts of SCT to develop their model. The study's core constructs include encouragement by others recognizing that an individual's judgement can be formed and shaped by the opinions of others, others' use or how other people use the computer, support or the kind and level of assistance available to users, outcome expectations or the extent to which positive consequences result from the behavior, affect or how much an individual likes to use the computer, anxiety or how much using a computer causes nervous feelings, and computer self-efficacy or individuals' beliefs about their abilities to competently use computers (Compeau & Higgins, 1995). Compeau and Higgins (1995) found that people with high self-efficacy used computers more, derived more enjoyment from their use, and experienced less computer anxiety.

Venkatesh et al. (2003) developed scales for the eight models described above, which they adapted and individually tested alongside four moderating variables (age, gender, experience, and voluntariness of use). The scales were found to explain "between 17% and 53% of the variance in intention to use information technology" (p. 425). Based on the results, UTAUT was re-formulated into seven constructs developed by grouping the component constructs of the previously tested eight models. The resulting seven constructs were (1) performance expectancy, (2) effort expectancy, (3) social influence, (4) facilitating conditions, (5) attitude toward using technology, (6) self-efficacy, and (7) anxiety. These were then added to

the four moderator variables (age, gender, experience, and voluntariness of use). Venkatesh et al. (2003) later observed that three of the seven constructs—attitude toward using technology, self-efficacy, and anxiety—did not play a significant role in predicting intention to use the technology.

In its original formulation, UTAUT included the variables attitude toward using the technology, self-efficacy, and anxiety (Venkatesh et al., 2003). Attitude toward using the technology was found to result from performance expectancy and effort expectancy. Self-efficacy and anxiety were taken from SCT but were found to be "indirect determinants of intention fully mediated by perceived ease of use" and captured inside effort expectancy (Venkatesh et al., 2003, p. 455). Thus, these three variables were removed from their final version of UTAUT.

The final four constructs that comprise UTAUT are performance expectancy, effort expectancy, social influence, and facilitating conditions, all of which displayed high reliability (Cronbach's alpha > 0.70). Each of the constructs are moderated by one of the four variables (age, gender, experience, and voluntariness of use). Performance expectancy refers to the extent to which individuals believe the technology will help them do their jobs better and is moderated by gender and age. Effort expectancy refers to an individual's assessment of how easy it is to use the technology, and is moderated by gender, age, and experience. Social influence is how much individuals think that those who are important to them believe they should use the technology. It is moderated by gender, age, voluntariness of use, and experience. Facilitating conditions refer to the extent to which individuals believe that the proper infrastructure is in place to support the technology, and is moderated by age and experience. Performance expectancy, effort

expectancy, and social influence are direct determinants of behavioral intention which, in turn, predicts use. According to Venkatesh et al. (2003), facilitating conditions directly predicts use.

UTAUT has been employed in a small number of studies on social media. Hanson et al. (2011) used it to explore health educators' acceptance of social media technologies. They found that effort expectancy (26.12%), performance expectancy (22.31%), and social influence (21.74%) all accounted for a total of 70.17% of the systematic variance in behavioral intention, and their Cronbach's alpha scores were all higher than 0.70. They also found a connection between effort expectancies and age group, with people aged 18-29 having lower effort scores (i.e., social media was easy for them to use) than older age groups (Hanson et al., 2011). The authors, however, did not focus on a specific social media technology and did not explore the effects of gender.

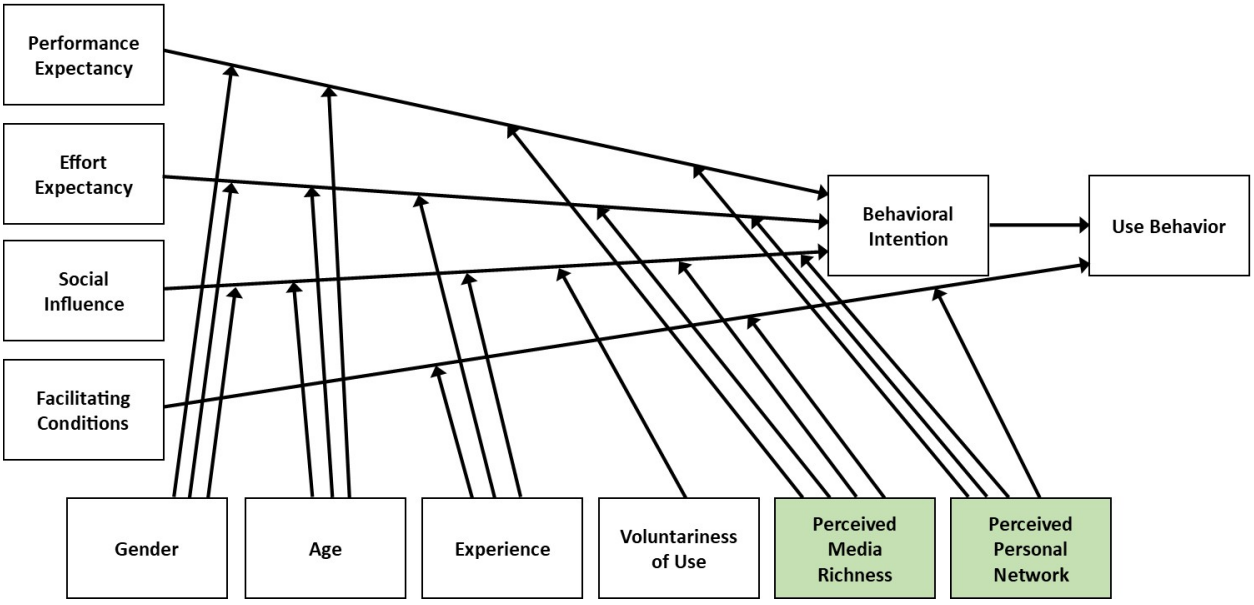

Figure 3: The modified UTAUT model, adapted from Venkatesh et al. (2003), "User acceptance of information technology: Toward a unified view"

The Modified Unified Theory of Acceptance and Use of Technology Model

The original UTAUT model failed to explain social network site adoption. According to Venkatesh et al. (2003), "further work should attempt to identify and test additional boundary conditions of the model to provide an even richer understanding of technology adoption and usage behavior" (p. 470). The current study heeds this advice. Considering the present study's focus on a social networking site, two new moderators were added to the original UTAUT formulation: perceived media richness and perceived personal network. These moderators were suggested by Kaba and Touré (2014) as "relevant to behavioral intention to use that deserve further consideration" (p. 1671). Kaba and Touré (2014) used UTAUT to measure young people's adoption and use of SNSs in an African country. A total of 1,030 high school- to college-age students responded to a slightly adapted UTAUT survey questionnaire. The researchers found that "UTAUT explained only 42.10% of the variance in behavioral intention to use [SNSs]" compared to 70% in the original Venkatesh et al. (2003) study (p. 1670).

A number of studies also have tested modified versions of the UTAUT. For example, Dulle and Minishi-Majanja (2011), studying researchers' adoption and use of open access technology in public universities, added attitude and Internet self-efficacy as constructs, and awareness and position (job) as moderators to the model. They observed a 68% overall explanatory ability. They also found that "attitude, awareness, effort expectancy, and performance expectancy are the main significant predictors" of behavioral intent (Dulle & Minishi-Majanja, 2011, p. 41). Dulle and Minishi-Majanja (2011) showed high Cronbach's alpha values (0.713 to 0.917) and retained all their constructs for exploratory factor analysis.

The first moderator added to this study is *perceived media richness*. According to Kaplan and Haenlein (2010), media channels differ "in the degree of richness they possess—that is, the

amount of information they allow to be transmitted in a given time interval" (p. 61). Media richness theory has four components: immediate feedback, multiple cues, language variety, and personalization (Lengel & Daft, 1988). Perceived media richness focuses on how well a person believes a communication medium can convey how he/she feels (Kaba & Touré, 2014). Although a social media application has a certain level of richness, the extent to which the user believes the application is able to execute on that level of richness may influence which applications are accepted and used. These four components of media richness will be included in the measure of perceived media richness as a moderator. The items that measure each of these four factors were adapted from Brunelle (2009) who studied how media richness affects consumers' use of online stores, and Lan and Sie (2010) who examined how media richness affects a mobile learning environment.

Perceived personal network is the second moderator added to UTAUT in this study. It is defined as "the proportion of adopters in a person's network" (Kaba & Touré, 2014, p. 1671). The idea is that a person surrounded by SNS users is also likely to use SNSs. This moderator primarily focuses on people's ego-networks, which serve as their personal connections with others. This moderator is composed of five factors: degree, tie duration, tie length, homophily, and density (Wasserman & Faust, 1994; Easley & Kleinberg, 2010). Degree represents the number of people or connections a person has in his/her social media networks. Tie duration represents how long a person has known those in his/her social media networks. Tie length represents spatially how far away people are in a person's social media network. Homophily refers to the notion that one's networks are made up of other like-minded individuals who use social media. Lastly, density represents how many are connected to each other within a person's social media networks. The items to measure these factors were adapted from Lin and Lu (2011)

who showed how network externalities impacted the perceived usefulness of continued intention to use SNSs. The modified UTAUT model that will be tested in this study is shown in Figure 3.

Information Seeking Behavior

Case (2012) defined information seeking as "behavior that occurs when an individual senses a problematic situation or information gap, in which his or her internal knowledge and beliefs, and model of the environment, fail to suggest a path towards satisfaction of his or her goals" (p. 386). Information seeking is a part of a larger discipline called information behavior. Wilson (2000) explains:

> Information behavior is the totality of human behavior in relation to sources and channels of information, including both active and passive information seeking, and information use. Thus, it includes face-to-face communication with others, as well as the passive reception of information as in, for example, watching TV advertisements, without any intention to act on the information given (p. 49).

The current study's second research question asks: What do farmers use Facebook for and to what extent do they use it to seek information about the farming enterprise? This study applies the tenets of the Comprehensive Model of Information Seeking to respond to this research question.

According to Bates (2002), information seeking can be directed and undirected, and that it can be active or passive. Bates lists four information seeking behaviors: searching (active and directed), monitoring (passive and directed), browsing (active and undirected), and being aware (passive and undirected). Active and passive information seeking "refer, respectively, to whether the individual does anything actively to acquire information, or is passively available to absorb

information, but does not seek it out" (para. 13). Directed and undirected information seeking, on the other hand, refers to "whether individuals seek particular information that can be specified to some degree, or is more or less randomly exposing themselves to information" (para. 13). Searching involves "active attempts" at finding specific information, while monitoring involves "back-of-the-mind alertness" in which information may come along to answer a question not actively being looked for. Browsing is the active exposure to new information. Being aware essentially refers to chance encounters with new information (Bates, 2002). This study focuses on farmers' active and directed or intentional information seeking behaviors (searching and browsing).

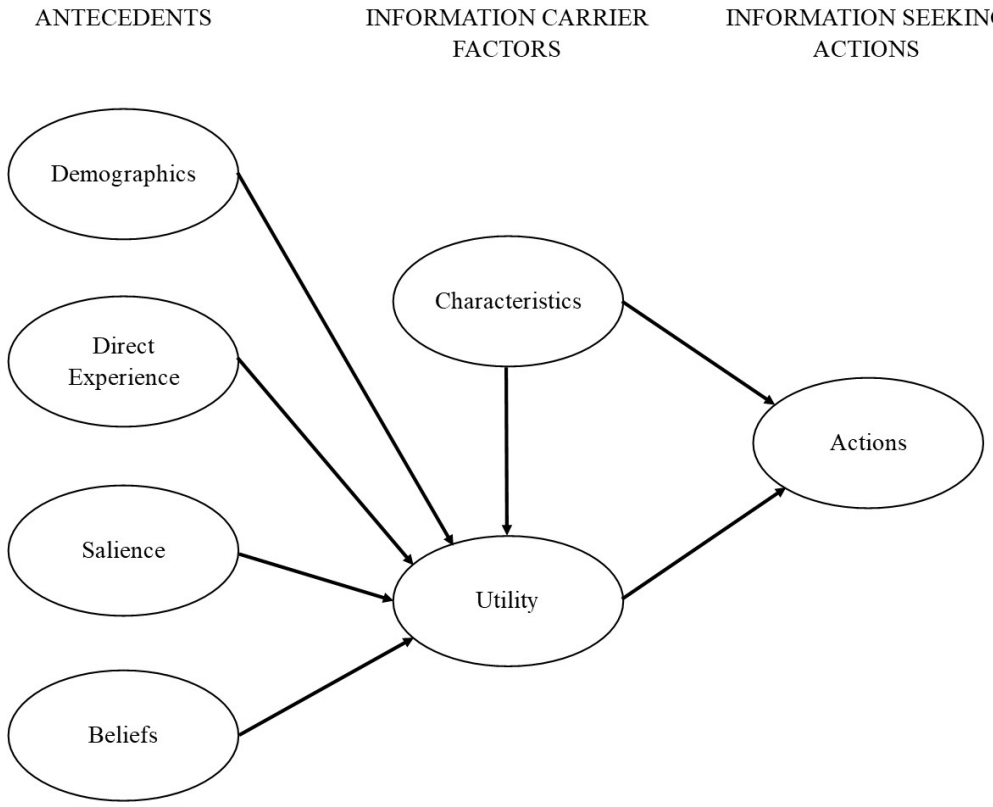

Figure 4: A comprehensive model of information seeking adapted from Johnson et al. (1995).

Comprehensive Model of Information Seeking (CMIS)

The Comprehensive Model of Information Seeking (CMIS) created by Johnson, Donohue, Atkin, & Johnson (1995) states that information seeking behavior is affected by two major groups of factors: antecedent variables and information carrier characteristics. It is illustrated in Figure 4. CMIS was constructed by combining three models: the Health Belief Model or HBM (Rosenstock, 1974), the Media Exposure and Appraisal (MEA) model (Johnson, 1983), and Uses and Gratifications theory (U&G) (Katz, Blumler, & Gurevitch, 1973).

The Health Belief Model (HBM) was developed in the early 1950s by a group of social psychologists (Hochbaum, Kegeles, & Rosenstock, 1952) out of a need to understand why people were not accepting preventative disease measures. HBM posits that "in order for an individual to take action to avoid a disease, he would need to believe: (1) that he was personally susceptible to it, (2) that the occurrence of the disease would have at least moderate severity on some component of his life, and (3) that taking a particular action would in fact be beneficial by reducing his susceptibility to the condition" (Rosenstock, 1974, p. 330).

Thus it includes perceived susceptibility to a disease and perceived seriousness of a disease; modifying factors: demographics, sociopsychological variables (personality, social class), structural variables (knowledge about the disease, prior contact with the disease), perceived threat, cues to action (mass media campaigns, advice from others) and likelihood of action, perceived benefits of preventative action minus perceived barriers to preventative action, and the likelihood of taking recommended preventive health action (Rosenstock, 1974). The concept of salience was initially considered but abandoned because researchers could not figure out how to measure it (Rosenstock, 1974). According to Case (2012), "salience implies [that] the

information is not only perceived to be relevant to a need, but that [it] is also applicable" (p. 153). It was added back in a later version of the HBM (Rosenstock, 1974).

The Media Exposure and Appraisal (MEA) model (Johnson, 1983) stemmed from George Gallup's studies on the readership of magazines in the 1930s. Johnson (1984) describes how previous media exposure research focused on "who reads and what is read" instead of "why people read and how much they value a particular communication source" (p. 63-64). MEA includes three constructs that affect appraisal of, and exposure to, a medium: editorial tone or how credible a person thinks the medium is, communication potential or how a person perceived the information presented which deals with items like style and comprehension, and utility or how the medium fulfills an individual's needs (Johnson, 1984).

The antecedent variables in the CMIS approach include demographics (age and gender), direct experience, salience, and beliefs. Direct experience deals with personal experiences in a domain (Johnson et al., 1995; Case, 2012), which is agriculture in the current study. Beliefs are important, according to Case (2012), because "feeling that we can solve a problem will motivate us to find the means to do so" (p. 153). The next component, information carrier factors, consists of the characteristics and utility of the selected information channel. Channel characteristics deal with the attributes of the channel, whereas the utility of the channel refers to how useful the channel is in providing the information being sought. Information seeking actions, the dependent variable in this case, involves both scope and depth (Johnson et al., 1995). Johnson et al. (1995) used scope to refer to the number of people or sources who were asked for information, and depth refers to the number of messages solicited. This study treats information seeking actions as the ways by which people search for information on Facebook, such as by using the search bar,

looking through group posts, and the Facebook pages and groups they accessed to find such information.

This model focuses on information seeking actions as the main outcomes while other information seeking models examine factors such as specific work roles and tasks, and information transfer from person to person (Case, 2012). CMIS had high Cronbach's alpha internal reliability measures, ranging from 0.67 to 0.91, with an adjusted goodness-of-fit index of 0.94 (Johnson et al., 1995). CMIS studies have produced variance contributions of 0.74 for characteristics, 0.42 for utility, and 0.90 for actions (Johnson et al., 1995). Antecedent variables were found to be non-significant contributors to information seeking in a study that involved the staff of a large Midwestern state government agency, 80% of which were male and 87% were Caucasians (Johnson et al., 1995).

CMIS has been used extensively within the health field, but the model can be applied to any domain. For example, Sheng and Simpson (2015) looked at senior citizens and how they sought information on the Internet for health-related purposes using CMIS. They found CMIS variables to be significant predictors ($p<0.001$), and reported an r-squared value of 0.69 for the overall model. CMIS, however, is seldom used in examining information seeking about agriculture and related topics through social media.

Uses and Gratifications Theory

The current study poses a third research question: What needs or gratifications are sought and what gratifications are derived from farmers' use of Facebook? This question will be studied following the tenets of Uses and Gratifications theory (U&G).

U&G was formulated to explain why people, as active audiences, choose and use certain media over others, and the needs people seek to fulfill with that use. Katz, Blumler, and Gurevitch (1973) summarizes U&G as: "(1) the social and psychological origins of (2) needs, which generate (3) expectations of (4) the mass media or other sources, which lead to (5) differential patterns of media exposure (or engagement in other activities), resulting in (6) need gratifications and (7) other consequences" (p. 510).

They also list five important facets of U&G:

1. The audience is conceived of as active.
2. In the mass communication process, much initiative in linking need gratification and media choice lies with the audience member.
3. The media compete with other sources of need satisfaction.
4. Methodologically speaking, many of the goals of mass media use can be derived from data supplied by individual audience members themselves.
5. Value judgements about the cultural significance of mass communication should be suspended while audience orientations are explored on their own terms.

U&G research started in the 1940s when mass communication scholars were particularly concerned with audiences' preferences for mass media channels such as TV, radio, comics, and newspapers (Katz et al., 1973). The early studies spent much time descriptively classifying audience members' responses, but "did not attempt to explore the links between the gratifications thus detected and the psychological or sociological origins of the needs that were so satisfied" (Katz et al., 1973, p. 509). U&G researchers were also criticized for failing "to search for the interrelationships among the various media functions…that might have led to the detection of the latent structure of media gratifications" (Katz et al., p. 509). Essentially, early efforts were

unable to provide a decent understanding of media gratifications. As time progressed, research focused more on these connections.

The rise of online communication and the growing online audiences helped to revive the U&G tradition (Ruggiero, 2000). According to Urista, Dong, and Day (2009), "as the number of members of [SNSs] increases, so does the popularity of using the sites for satisfying cognitive and affective needs" (p. 219). Urista et al. (2009), studying 50 undergraduate students who were members of either MySpace or Facebook, found five major themes of needs and wants fulfillment from SNSs: efficient communication, convenient communication, curiosity about others, popularity, and relationship formation and reinforcement.

Raacke and Bonds-Raacke (2008) applied U&G to explore why students use MySpace and Facebook. Their 116 college student-respondents said they held accounts in these sites "to keep in touch with old friends" (96%), "to keep in touch with current friends" (91.1%), and "to post/look at pictures" (57.4%). The non-users said they did not have accounts at either site because "I just have no desire to have an account" (73.3%), "I am too busy" (46.7%), and "I do not want other people to know about my personal business" (26.7%). Students who use SNSs tended to "spend almost three hours per day either on their account or someone else's account" (p. 173). Connecting with friends fulfills a relationship need and learning about events fulfills an information need.

Palmgreen, Wenner, and Rayburn (1980) also applied U&G to find out why people watch television news programs, and tested the relationships between gratifications sought (GS) and obtained (GO) for five constructs: general information seeking, decisional utility or choosing to seek information to help with making a decision, entertainment, interpersonal utility or seeking information to help converse with others, and parasocial interaction or people having one-sided

relationships with media personalities/celebrities like real people. They interviewed 327 people over the phone. All correlations between GS items and the corresponding GO items were highly significant ($p<0.001$). The results of their factor analysis reduced the five hypothesized constructs to three: interpersonal utility-surveillance, entertainment, and parasocial interaction for GS; and interpersonal utility, surveillance, and entertainment-parasocial interaction for GO. Palmgreen, Wenner, and Rayburn's (1980) survey instrument will be adapted to Facebook use in the current study.

As a whole, "U&G continues to be exceedingly useful in explaining audience activity when individuals are most active in consciously making use of media for intended purposes" (Ruggiero, 2000, p. 19). Are there special needs and gratifications pertinent to the agriculture domain that can be accounted for by farmers' Facebook use?

CHAPTER 3: METHODS

This study applied a mixed methods approach to collect data. Venkatesh, Brown, and Bala (2013) describe mixed methods research as using "quantitative and qualitative research methods, either concurrently (i.e., independent of each other) or sequentially (e.g., findings from one approach inform the other), to understand a phenomenon of interest" (p. 23). Two benefits of mixed methods are their "ability to address confirmatory and exploratory research questions simultaneously" and their "ability to provide stronger inferences than a single method or worldview" (Venkatesh et al., 2013, pp. 24–25). The combination of these two types of data collection techniques enhances a study's external validity and often leads to more reliable and robust results. The blending of these two modes has been known to be particularly powerful in uncovering new insights. This is because quantitative data collection allows the researcher to gather information from a large pool of respondents, whereas qualitative data collection enables researchers to harness data, often described as "deep and rich," from a small respondent group. The latter is often applied by those who wish to gain an understanding of underlying reasons, opinions, and motivations. The mixed methods approach is thus more likely to provide results that offer a broader perspective of the research problem (Venkatesh et al., 2013).

In this study, the quantitative aspect entailed conducting a survey of farmers and those involved in the agriculture industry in the state of Illinois. The qualitative part involved performing a content analysis of respondent-suggested agriculture-related public Facebook pages and the Facebook sites operated by groups with special interests in agriculture.

Quantitative Data

The quantitative part of this study asked the following research questions:

RQ1: What factors lead to the acceptance and adoption of Facebook among farmers?

RQ2: What do farmers use Facebook for and to what extent do they use it to seek information about their farming enterprise?

RQ3: What needs are answered and what gratifications are derived from farmers' use of Facebook?

To gather quantitative data, a survey of Illinois County Farm Bureau members and followers, as well as Illinois County Extension members and followers, was conducted. The questionnaire was created and housed on Qualtrics, an online subscription software. The link to the survey questionnaire was distributed via stand-alone emails, announcements in extension and related newsletters, Facebook posts, and Twitter posts (tweets). Approximately 16,064 people were contacted through the Illinois County Farm Bureau offices and Extension offices.

The study obtained approval from the University of Illinois' Institutional Review Board (Appendix A). The questionnaire was pilot-tested to a convenience sample of five people who work in the agriculture industry. Minor changes were made to the questionnaire based on the pretest results before it went live.

The survey questionnaire

The questionnaire (Appendix B) contained a total of 125 items divided into seven sections: Survey Eligibility, Acceptance of Facebook, Information Seeking Behaviors on Facebook, Demographics, Facebook and Social Media Habits, Gratifications Sought and Obtained, and Survey Exit Message.

The section on the Acceptance of Facebook measured the UTAUT constructs, including the newly added moderators. The Information Seeking Behaviors on Facebook section measured the CMIS constructs, and the Gratifications Sought and Obtained section measured U&G constructs. The majority of the items were adapted from studies conducted by Venkatesh et al. (2003), Johnson et al. (1995), and Palmgreen, Wenner, and Rayburn (1980).

To determine those who are eligible to participate, respondents were asked three questions in succession. The first one queried if they work in the agriculture industry. The second asked if they have ever used Facebook for agriculture reasons. If respondents answered "yes" to both questions, they were eligible to participate in the survey. If they answered "no" to the first question, they were directed to the exit page. If they answered "no" to the second question, they were asked to answer a follow-up inquiry: "If you have not used Facebook for agriculture purposes, what are your reasons for not doing so? Please write down your reason(s)." Afterwards, they were sent to the exit page.

Once they have completed the questionnaire, respondents were shown the Survey Exit Message in which they were presented the option to enter in a drawing for a chance to win one of four Amazon.com gift cards, valued at $50 each, as an incentive for their participation.

The UTAUT questions measured four constructs hypothesized to have an influence on technology acceptance and use (Venkatesh et al., 2003). These are performance expectancy, effort expectancy, social influence, and facilitating conditions. The original proposition outlines four moderators (gender, age, experience, and voluntariness of use). New items were added to measure the two moderators (perceived media richness and perceived personal network), which the current study tests. The dependent variables are behavioral intention (acceptance) and use behavior (use). Using seven-point Likert scales ranging from "strongly disagree" (1) to "strongly

agree" (7), participants were asked to choose a response option that best describes the extent to which they agree with each statement (apart from gender, age, and experience).

The CMIS questions measured seven constructs hypothesized to influence information seeking behavior (demographics, direct experience, salience, beliefs, channel characteristics, channel utility, and action) (Johnson et al., 1995). As in the case of UTAUT constructs, the CMIS variables were measured by presenting respondents with a series of statements grouped by construct and using seven-point Likert scales with response options ranging from "strongly disagree" (1) to "strongly agree" (7) as described earlier.

The U&G survey instrument originally formulated by Palmgreen, Wenner, and Rayburn (1980) measured gratifications sought and obtained, and is composed of five constructs: general information seeking, decisional utility, entertainment, interpersonal utility, and parasocial interaction. Respondents were offered 15 reasons why people say they use Facebook. Groups of three statements comprised each GS and GO construct. Respondents were asked to indicate the extent to which each reason applies to them on a scale of 1 (strongly disagree) to 7 (strongly agree).

Quantitative data analysis

The following process describes the survey data analysis for UTAUT. First, descriptive statistics were analyzed to characterize the distribution of responses to each question using the appropriate measure of central tendency (mean, median, or mode). Whenever means and medians were computed, standard deviation and skewness figures were also specified. Second, the Kaiser-Meyer-Olkin (KMO) test was run on the construct items and the two new moderators (because they are not categorical) to determine whether exploratory factor analysis (EFA) would

be adequate to test if the factors were loading according to theory. According to Field (2006), values of 0.5 or higher for KMO are acceptable because this means the correlations are not too spread out, and the sampling procedure is adequate.

Third, EFA, specifically principal component analysis (PCA), was used to determine which items in the constructs and new moderators can be removed before performing multiple linear regression. Using PCA for dimensionality reduction transforms the constructs into those with items that account only for the highest amounts of variance. The varimax rotation technique was used because it works to make small loadings smaller, thus emphasizing the high loadings (Yong and Pearce, 2013), which aids in determining which items should be removed. Items that cross-loaded on components with very close scores or had low loadings were taken out. Yong and Pearce (2013) advise researchers to minimize items that cross-load "so that each factor defines a distinct cluster of interrelated variables" (p. 84). They also recommend removing items with loadings lower than 0.32 (Yong and Pearce, 2013). The goal is to end up with one principal component per construct or new moderator to simplify the model.

Cronbach's alpha was computed to measure the internal consistency of items and to show how closely the items relate to each other (Hinkin, 1995). According to Venkatesh et al. (2003), Cronbach's alphas that are 0.70 or higher are considered reliable. Items that were shown to significantly improve Cronbach's alpha if deleted were removed. Once items were removed from the constructs, PCA was performed again, along with the KMO test. This pattern was repeated to find a balance between variance explained and reliability.

Finally, multiple linear regression was applied to determine the constructs that contributed significantly to behavioral intention and use behavior. Thus, two separate regression tests were done. Performance expectancy, effort expectancy, social influence, and their

respective moderators and interactions were the predictor variables for behavioral intention. On the other hand, behavioral intention and facilitating conditions with their respective moderators and interactions were hypothesized to influence use behavior. The regressions were performed by using the constructs' factor scores from PCA, the categorical variables (the moderators), the two new moderators' factor scores from PCA, and the interactions between the moderators and the constructs. This method is consistent with Hanson et al.'s (2011) study that tested the conceptual model.

Several UTAUT variables were recoded. The original moderators were transformed into dummy variables so they can be used consistently as categorical variables. Gender was recoded into 1=female and 0=male. None of the respondents selected the first two categories in the experience variable, which is why it was recoded into 1=1-2 years and 0=3+ years. Age was determined using ranges, so it was recoded into six variables, one for each of the age range groups (18-21, 22-25, 26-30, 31-40, 41-50, 51-60), assigning 1 to those in that group, and a 0 to those not in that group. Age 61+ was left out as the reference (zero) group because it was one of two groups with the highest frequency. Use behavior was originally made up of three Likert-scale items, but due to the ambiguity of responses, the answers to how often respondents use Facebook was used to measure this variable instead. This variable was then recoded into a continuous variable to represent the number of times a year a participant used Facebook. An answer of "A few times a month or less" was recoded to 24 (times a year), "Once a week" was recoded to 52, "Every day or two" was recoded to 365, and "Several times a day" was recoded to 730.

The following process describes how CMIS data was analyzed. The impact of CMIS variables was examined using a procedure similar to that applied in analyzing UTAUT data. A

descriptive analysis was done, followed by KMO, PCA, and Cronbach's alpha calculations. Multiple linear regression was also used to determine the constructs which contributed to information carrier utility and information seeking actions. In this case, carrier utility was the dependent variable. The independent variables were demographics, direct experience, salience, beliefs, and information carrier characteristics. The other dependent variable, information seeking actions, was hypothesized to be influenced by information carrier characteristics, information carrier utility, and the interaction between them. Two separate regressions were conducted, performed by using the constructs' factor scores from PCA, the categorical variables, and the interaction between the two constructs. This method is consistent with Sheng and Simpson's (2015) study that applied regression to examine the impact of CMIS variables.

Several CMIS variables were recoded. Gender and age were dummy-coded as described in the UTAUT analysis, and education was dummy-coded in the same way as the age groups. The four-year college degree selection was left out as the reference group because it had the highest frequency. The direct experience variables—agriculture experience and farming income—were dummy coded similar to the age groups, with those who had worked in agriculture more than 20 years and those whose farming income was $10,000-$99,999 left out as the reference groups because they had the highest frequencies. To dummy-code the area of agriculture in which the respondents worked, three groups that had the highest frequencies were created: farming (animals), farming (plants), and agri-business. Those who selected something other than these categories were placed in the reference group, receiving a code of 0.

The following process describes the survey data analysis for U&G. First, descriptive analysis was conducted to characterize the GS and GO responses using measures of central tendency. Second, each GS measure was correlated with its corresponding GO measure using

Pearson's correlation to determine how strong the relationships were on an individual item basis. Third, KMO, PCA, and Cronbach's alpha calculations were performed. PCA was used to determine if the items grouped together as originally hypothesized by Palmgreen, Wenner, and Rayburn (1980). The third step was performed separately for the GS and GO results. Fourth, the extracted items were grouped into constructs for GS and GO separately and compared to see if the groupings were similar or different between GS and GO. Steps two through four were consistent with Palmgreen, Wenner, and Rayburn's (1980) study. Finally, the PCA components (constructs) were correlated with several demographic variables to understand how agriculture and social media experience are related to GS and GO.

Qualitative Data

To gather qualitative data, text from posts, comments, and replies on public and group Facebook pages were mined and analyzed both manually and by using automated processes. Content analysis was conducted to answer the following research question:

RQ2: What do farmers use Facebook for and to what extent do they use it to seek information about their farming enterprise?

The Facebook pages that were analyzed for this part of the study were identified by the survey respondents. In the questionnaire, respondents were asked to list up to five agriculture-focused public *groups* on Facebook of which they are a member, and to provide direct links to these Facebook pages, if possible. They were also asked to list up to five agriculture-focused public *pages* on Facebook they have *liked* before and the direct links to these. If an answer did not correspond close enough to a searched public or group Facebook site, it was discarded. Pages with an invalid link also were not used.

Qualitative data collection

A total of 105 Facebook groups and 152 Facebook public pages were identified by those who participated in the survey. Due to the large number of group and public pages, one-third of the groups (35) and one-third of the public pages (51) were randomly selected for data collection using the Google random number picker via their row number in an Excel spreadsheet (Appendix C). Two undergraduate students from the University of Illinois were recruited to "scrape" text from the pages and perform coding. The researcher met with them four times over three months to discuss the present study and its objectives, train them on the coding protocols, discuss coding discrepancies, and review the results.

Each student was assigned to code one-half of the total number of group and public and pages that were randomly selected (86). Codes were recorded in an Excel spreadsheet following the codebook shown in Appendix D. Only posts that were published from January 2018 through April of 2019 were analyzed. The coders were instructed to review only the text, ignoring photos and other images, links, emojis that indicate reactions to the post, and/or the names of people who were tagged. In the group pages, the first 35 posts with information-seeking content were selected. These included the post itself, comments, and/or replies. A maximum of 35 comments and replies were analyzed for each post, with a minimum of one, which can be the main post itself. A similar selection process was applied to the public pages. The first 25 posts with information-seeking content were selected. A maximum of 25 comments and replies were selected for each post, with a minimum of one, but this time, it cannot be the post itself. In the group pages, posts are submitted by individuals; on the public pages, posts are submitted by page admins (managers). A page can have multiple admins. Because public page posts are often directed to the general public, it is harder to discern if the admin who posted was an individual

seeking the information or just posting on behalf of the page's interest. Thus, text collection was limited only to comments and replies by individuals.

Qualitative data analysis

According to Hsieh and Shannon (2005), the goal of a directed approach to content analysis is "to validate or extend conceptually a theoretical framework or theory" (p. 1281). In this study, domain categorization, word and bigram frequencies, and term frequency—inverse document frequency (tf-idf) analysis—were used. The domains and collected texts provided information about the types of agriculture information being sought on Facebook, which ties into CMIS results and the GS and GO from Facebook use gleaned from the survey.

The first part of the analysis involved coding the mined text into one of eleven domains pre-determined by the researcher based on the topic spread in the public and group pages. These domains were listed in the codebook shown in Appendix D. The two undergraduate students selected a subject domain, which was based on the area to which the information-seeking text referred, such as animals or farm equipment. After scraping and coding the selected text, the domain codes were wiped, and the texts were given to the other student to code. This cut down the amount of scraping and coding time. Then, Cohen's kappa was computed to determine inter-coder reliability. The kappa statistic measures the observed level of agreement between coders for a set of nominal ratings and corrects for agreement that would be expected by chance (Hallgren, 2012, p. 5). Cohen's kappa is appropriate to use when two coders are coding the same dataset. Values can range from perfect agreement (1) to perfect disagreement (-1), with 0 indicating that the agreement was completely by chance (Hallgren, 2012). According to Landis

and Koch (1977), values between 0.61–0.80 suggest substantial agreement; values of 0.81 and above suggest perfect agreement.

The coding language R was used for the rest of the analysis.[1] The R library *tidytext* and its associated dependencies were the main tools used to clean and visualize the texts. First, the spreadsheet was saved as a CSV and parsed into a specific tidy-document format. It was reviewed to make sure there were no odd formatting issues, and that each text was collected on its own line in the spreadsheet. Second, numbers, whitespaces, and stop words were removed, and "stemming" was performed. This procedure cleans the data of unnecessary items and allows for more accurate word frequencies to be calculated based on the words' stems. Third, several sets of frequencies were calculated. Line calculations resulted in how many individual texts were collected in each domain. Word frequencies were calculated to discover the most common words in the whole dataset and in each domain. Bigram frequencies were ascertained to see which pairs of words were used most frequently together as a whole and in each domain. Tf-idf was performed to see what words and bigrams held the most relevance in each domain. This calculation finds word or bigram frequencies in each document (in this case, a document is a domain) and compares those frequencies to the inverse of how often that word or bigram appears over all the documents (Ramos, 2003). A higher tf-idf number for a word or bigram means its relationship with that document is strong (Ramos, 2003). Finally, visualizations were created to easily see the top terms for all these calculations.

[1] The complete R script can be found at this link: https://github.com/carter5/Dissertation_Code.

Informed Consent and Data Confidentiality

Several steps were taken to address consent, data confidentiality, and data storage. The survey was designed to guarantee anonymity; no personal information was collected. If participants chose to enter the drawing for an Amazon.com gift card, the survey provided a separate link at the end, sending them to another questionnaire that collected personal information (name, phone, and email). This kept the identity of respondents separate from their answers. No names were mentioned in the discussion of findings and their implications.

Respondents were able to waive written consent at the beginning of the online survey. All data gathered was stored on the university-licensed Box.com for security and reliability of access. A copy of the dataset was held on a password-protected desktop hard drive. The undergraduate student coders were given access to a separate shared folder inside Box.com in which only mined Facebook texts were shared. All personally-identifying information inside the posts were taken out of the data mined from Facebook.

CHAPTER 4: RESULTS

Survey Participation

A total of 333 responses to the questionnaire were received between December 2018–February 2019. Qualtrics marked 21 responses as spam, resulting in 312 valid responses. Of those responses, 302 respondents gave their consent to participate, 165 said they worked in the agriculture industry, and 115 who said they work in the agriculture industry reported that they have used Facebook for agriculture purposes. This resulted in a total of 115 completed questionnaires from eligible participants, which were analyzed for this study.

UTAUT Results

UTAUT descriptive results

UTAUT predicts that the following demographic variables might have an impact on technology use: gender, age, and length of time using Facebook (experience). Table 1 shows the frequency distributions for these three variables. Gender had a third option of "other"; length of time using Facebook had two other options, "Less than 6 months" and "6 – 11 months," but because these had frequencies of zero, they were excluded from the analysis.

Table 1: UTAUT demographic variable frequencies

	Demographic	Frequency	Percent
Gender (N=115)	Male	54	47.0%
	Female	61	53.0%
Age (N=115)	18-21	4	3.5%
	22-25	6	5.2%
	26-30	12	10.4%
	31-40	28	24.3%
	41-50	23	20.0%
	51-60	14	12.2%
	61 or over	28	24.3%
Length of time using Facebook (N=115)	1-2 years	4	3.5%
	3+ years	111	96.5%

UTAUT PCA results

PCA was used to reduce the dimensionality of the performance expectancy, effort expectancy, social influence, and facilitating conditions constructs, as well as the perceived media richness and perceived personal network moderators. Figure 5 and Table 2 show the initial factor loadings for these six groupings. The total KMO score before removing items was 0.754. Items EE2_R and FC3_R were reverse-coded after the initial PCA run, which allowed for these items to load positively on their component.

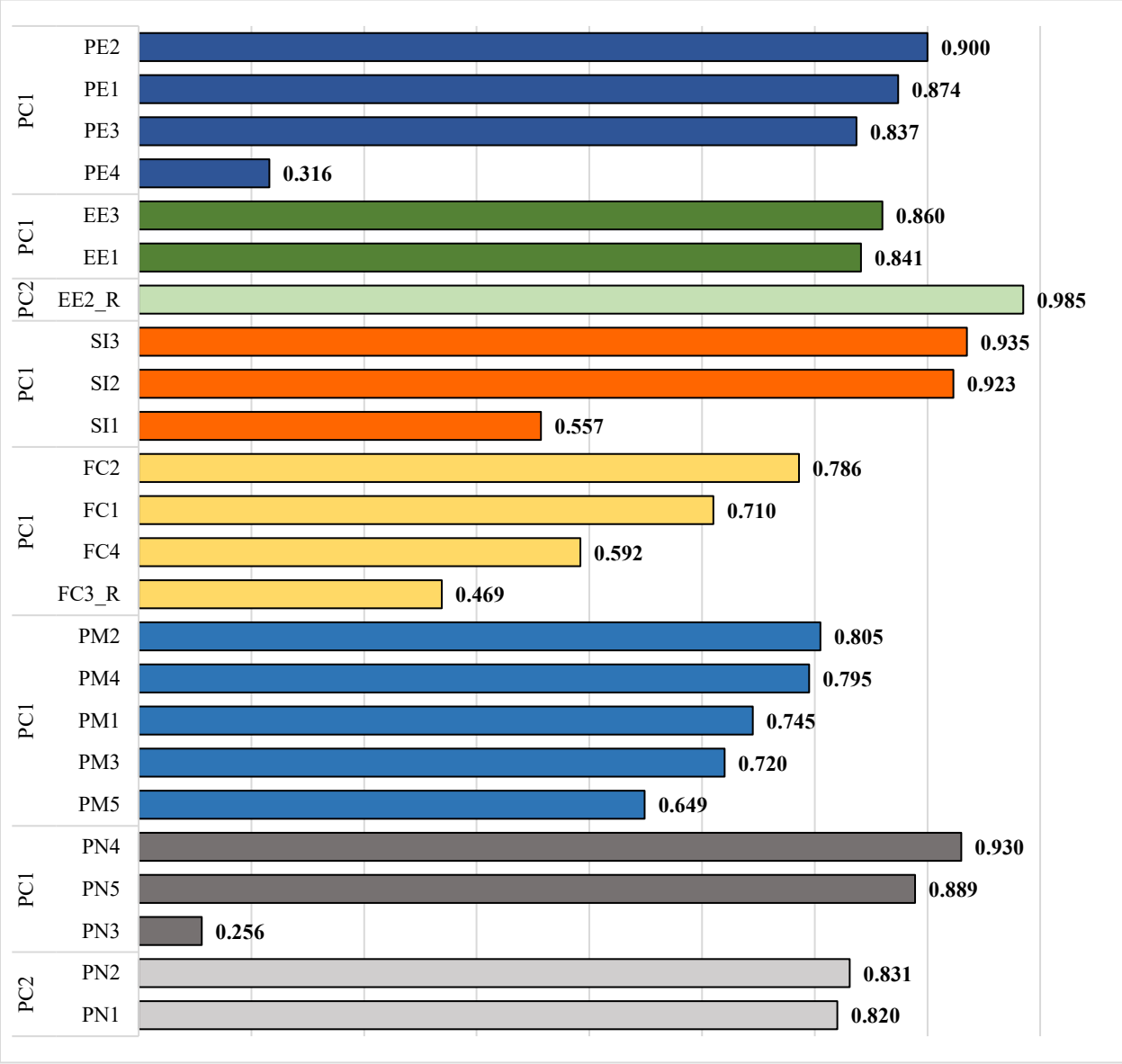

Figure 5: UTAUT initial item loadings for the constructs and new moderators

Table 2: UTAUT initial item loadings for the constructs and new moderators;
Note: bolded items show the heaviest loadings in each component

		Component	
	Item	**1**	**2**
Performance expectancy	Using Facebook enables me to accomplish my tasks quickly. (PE2)	**.900**	
	In general, I find Facebook useful. (PE1)	**.874**	
	Using Facebook increases my productivity. (PE3)	**.837**	
	I can use Facebook wherever I am. (PE4)	**.316**	
Effort expectancy	Learning to operate Facebook is easy for me. (EE3)	**.860**	-.145
	Facebook clearly shows how I can interact with people. (EE1)	**.841**	.195
	Facebook takes too much time from normal routines. (EE2_R)	.021	**.985**
Social influence	Most people who are important to me think that I should use Facebook. (SI3)	**.935**	
	Most people who influence my behavior think that I should use Facebook. (SI2)	**.923**	
	I consider myself trendy because I use Facebook. (SI1)	**.557**	
Facilitating conditions	I have the computer knowledge necessary to use Facebook. (FC2)	**.786**	
	I have the Internet access necessary to use Facebook. (FC1)	**.710**	
	Most people I know can help me with any problems I encounter using Facebook. (FC4)	**.592**	
	Facebook is not compatible with other communication technologies I use. (FC3_R)	**.469**	
Perceived media richness	Facebook allows me to tailor the messages I send through it. (PM2)	**.805**	
	A wide range of supporting tools (e.g., photo and message sharing, video sharing) are available on Facebook. (PM4)	**.795**	
	Facebook allows me to give and receive information in a timely fashion. (PM1)	**.745**	
	I am able to communicate a variety of emotions and attitudes on Facebook. (PM3)	**.720**	
	I can join a wide range of social activities on Facebook (e.g., fan pages, quizzes). (PM5)	**.649**	
Perceived personal network	Most people in my Facebook networks have interests that are similar to mine. (PN4)	**.930**	-.059
	Most people in my Facebook networks are friends with each other. (PN5)	**.889**	.168
	Most people in my Facebook networks live far away. (PN3)	**.256**	.187
	I have known the people in my Facebook networks for a long time. (PN2)	.124	**.831**
	Most of my friends are using Facebook. (PN1)	.056	**.820**

Items were removed one at a time with PCA being re-run after each removal to update the loading scores. Item PE4 was removed due to low loading. Item EE2_R loaded very highly on a second component, but removing the item resulted in a higher Cronbach's alpha. Items SI1, FC3_R, and FC4 were removed to improve the Cronbach's alpha. Items PM3, PM4, and PM5 were culled out to increase Cronbach's alpha and the percent variance explained by the components. Item PN3 also was removed due to low loading. Items PN1 and PN2 loaded on component 1, and items PN4 and PN5 loaded on component 2. Both components were used in the initial regression. Figure 6 and Table 3 show the final item loadings for these six groupings

after item removal. Table 4 shows the constructs and the resulting Cronbach's alphas. The resulting total KMO score is 0.755.

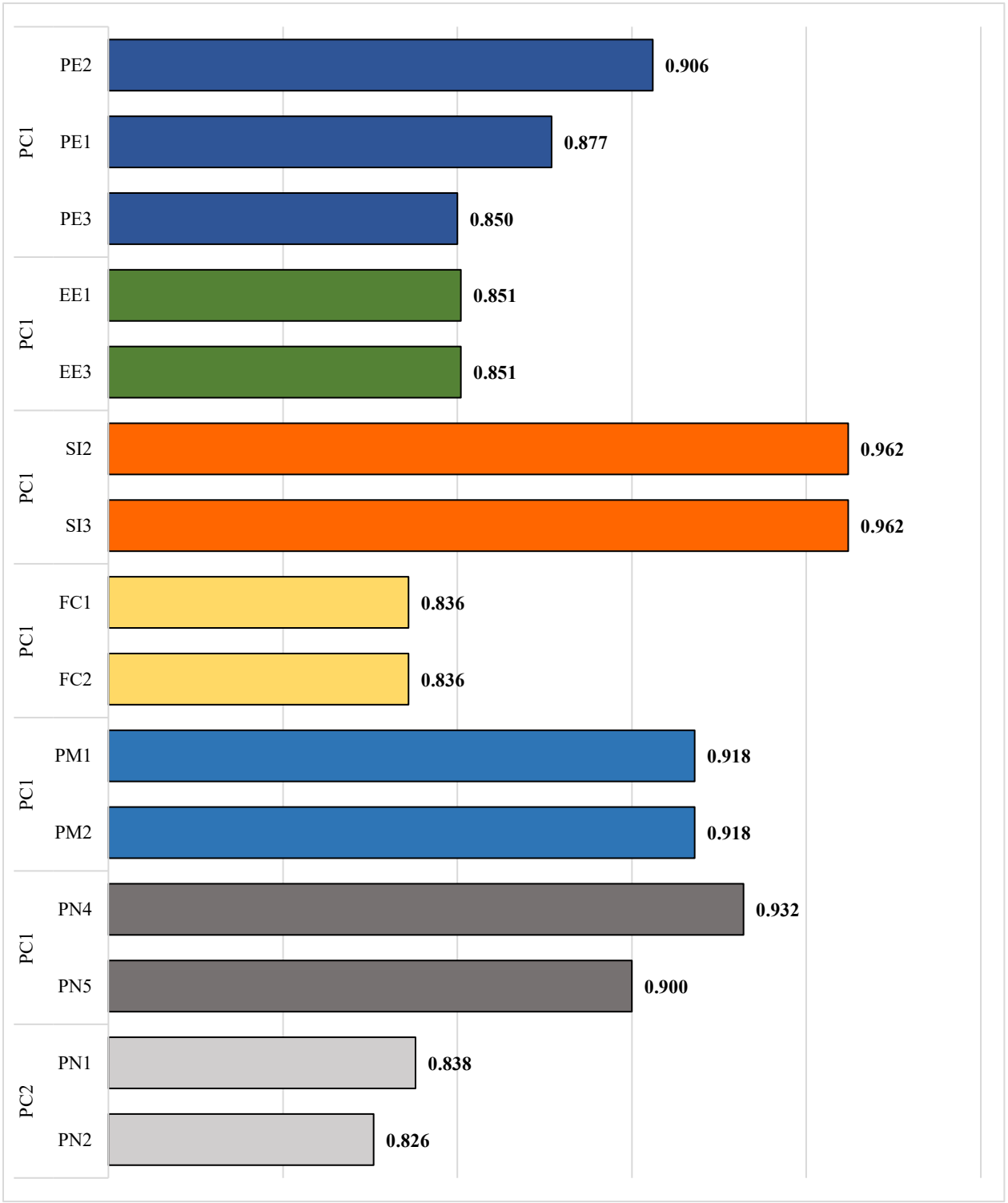

Figure 6: UTAUT final item loadings for the constructs and new moderators

Table 3: UTAUT final item loadings for the constructs and new moderators

		Component	
	Item	**1**	**2**
Performance expectancy	Using Facebook enables me to accomplish my tasks quickly. (PE2)	**.906**	
	In general, I find Facebook useful. (PE1)	**.877**	
	Using Facebook increases my productivity. (PE3)	**.850**	
Effort expectancy	Facebook clearly shows how I can interact with people. (EE1)	**.851**	
	Learning to operate Facebook is easy for me. (EE3)	**.851**	
Social influence	Most people who influence my behavior think that I should use Facebook. (SI2)	**.962**	
	Most people who are important to me think that I should use Facebook. (SI3)	**.962**	
Facilitating conditions	I have the Internet access necessary to use Facebook. (FC1)	**.836**	
	I have the computer knowledge necessary to use Facebook. (FC2)	**.836**	
Perceived media richness	Facebook allows me to give and receive information in a timely fashion. (PM1)	**.918**	
	Facebook allows me to tailor the messages I send through it. (PM2)	**.918**	
Perceived personal network	Most people in my Facebook networks have interests that are similar to mine. (PN4)	**.932**	-.032
	Most people in my Facebook networks are friends with each other. (PN5)	**.900**	.207
	Most of my friends are using Facebook. (PN1)	.051	**.838**
	I have known the people in my Facebook networks for a long time. (PN2)	.092	**.826**

Table 4: UTAUT constructs and resulting Cronbach's alphas

Construct	**Cronbach's alpha**
Performance expectancy	.852
Effort expectancy	.618
Social influence	.918
Facilitating conditions	.569
Perceived media richness	.814
Perceived personal network	.602

UTAUT multiple linear regression results

Regression was performed using performance expectancy, effort expectancy, and social influence as predictors of intention to use Facebook in the next six months. Then, gender, age, experience, voluntariness of use, perceived media richness, and perceived personal network moderators and interaction terms were added. Table 5 shows the final regression with only the significant items. Interaction effects that resulted in multicollinearity effects (high VIF values) and those that were not significant were removed. The regression results show 21.3% of the variance explained for intention, with the model itself being significant at $p < .001$. Voluntariness of use positively contributed the most to the model, with performance expectancy being a close second.

Table 5: UTAUT regression for intent to use;
N=113, Adjusted R^2 = .213 (*p < .05; **p < .01, ***p < .001)

	B	SE B	B	*p*	VIF
Constant	5.466	.302		.000***	
Performance Expectancy	.147	.052	.246	.006**	1.099
Social Influence	.113	.049	.202	.022*	1.071
Gender	.240	.097	.212	.015*	1.057
Voluntariness of Use	.135	.046	.247	.004**	1.017

Figure 7 shows the normal p-plot of the regression standardized residuals and Figure 8 shows the scatterplot of the residuals. Two points were found outside of the normalized -3 to 3 range with low residuals. Because these points were negatively skewing the R-squared value, they were removed. These figures confirm linearity.

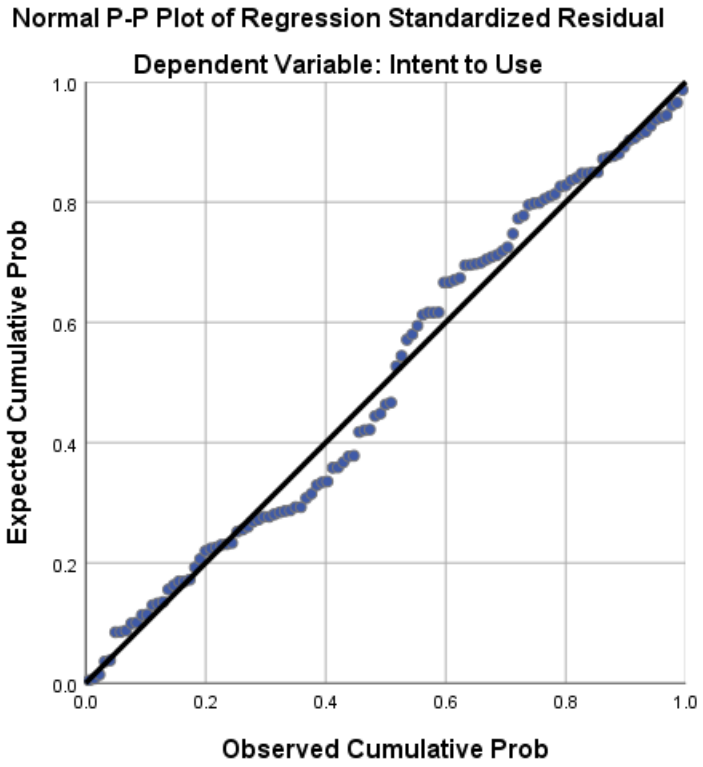

Figure 7: Normal p-p plot for regression standardized residuals for intent to use

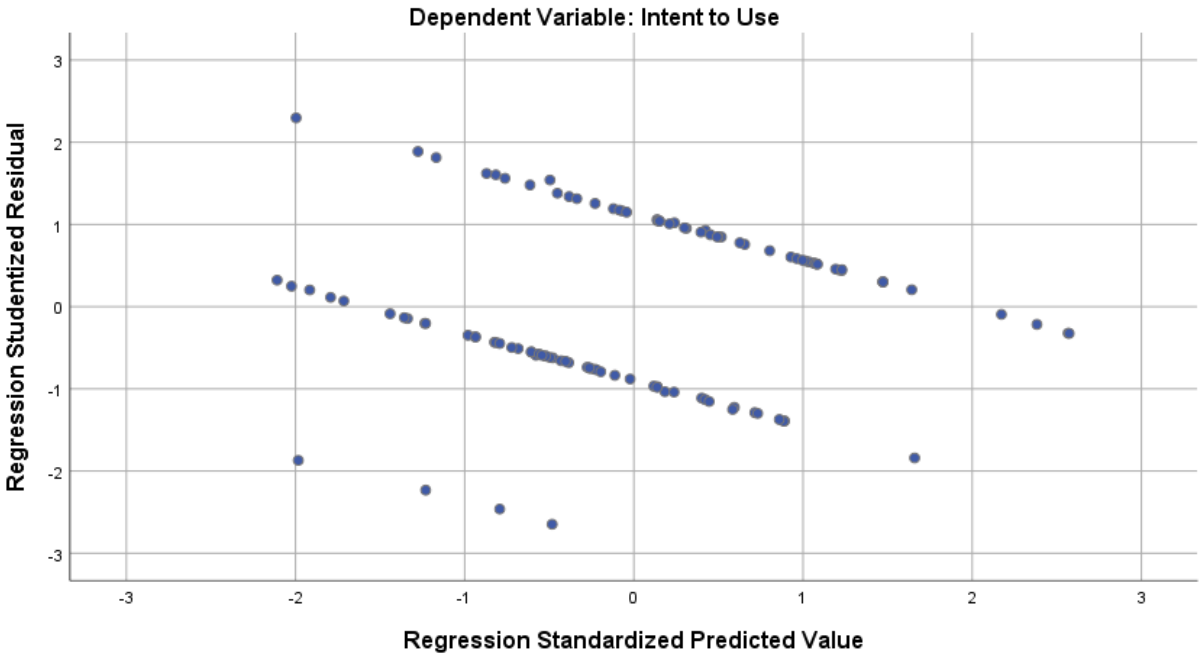

Figure 8: Scatterplot of the residuals for intent to use

Regression was performed using intention to use and facilitating conditions as predictors of Facebook use, after which experience and its interaction term were added. Perceived media richness, perceived personal network, and their interaction terms were included in the second regression. The R-squared value increased when the new moderators were added. Table 6 shows the results of the final regression without the added moderators, while Table 7 shows the final regression output with the added moderators. Interaction effects were not significant in either model. The first regression resulted in 45.4% of the variance explained for use behavior, with the model itself being significant at $p < .001$. The second regression resulted in 55.3% of the variance explained for use behavior, with the model itself being significant at $p < .001$. In both models, intention to use positively contributed the greatest amount of variance to the model, and experience (lack thereof) was a significant but negative contributor to the model.

Table 6: UTAUT regression for use behavior; N=112, Adjusted R^2 = .454 (***p < .001)

	B	SE B	β	*p*	VIF
Constant	-21.542	107.886		.842	
Behavioral Intention	103.265	16.777	.433	.000***	1.006
Experience	-546.050	78.160	-.492	.000***	1.006

Table 7: UTAUT regression for use behavior with added moderators; N=113, Adjusted R^2 = .553 (**p < .01, ***p < .001)

	B	SE B	β	*p*	VIF
Constant	137.871	110.375		.214	
Behavioral Intention	76.981	17.234	.312	.000***	1.222
Experience	-453.451	74.433	-.394	.000***	1.049
Perceived Media Richness	43.788	16.502	.203	.009**	1.472
Perceived Personal Network PC2	55.307	15.075	.259	.000***	1.249

In the first regression shown in Table 6, three points were found outside of the normalized -3 to 3 range with low residuals. They were removed because they were negatively skewing the R-squared value. The p-plot and residual scatterplot are not shown for this first regression because of sparse data points. This is because there are only two independent variables that can predict four different responses to the use behavior (the dependent variable), resulting in a less-continuous flow of data compared to the other regression runs. Linearity is still confirmed based on the residual statistics.

Figure 9 shows the normal p-plot of the regression standardized residuals, and Figure 10 shows a scatterplot of the residuals for the second regression in Table 7. Two points were found outside of the normalized -3 to 3 range with low residuals. Because of these points are negatively skewing R-squared value, they were removed. Linearity is confirmed with these figures.

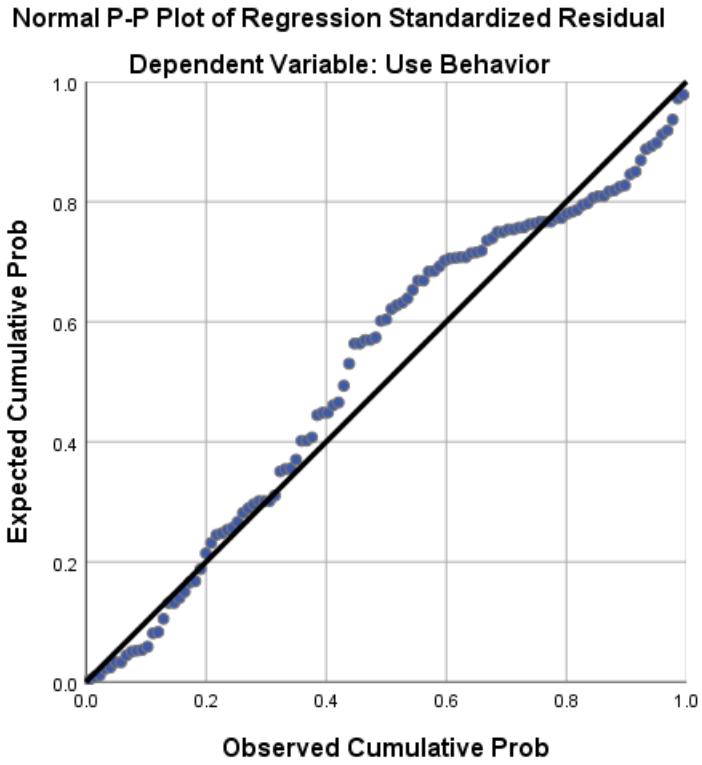

Figure 9: Normal p-p plot for regression standardized residuals for use behavior

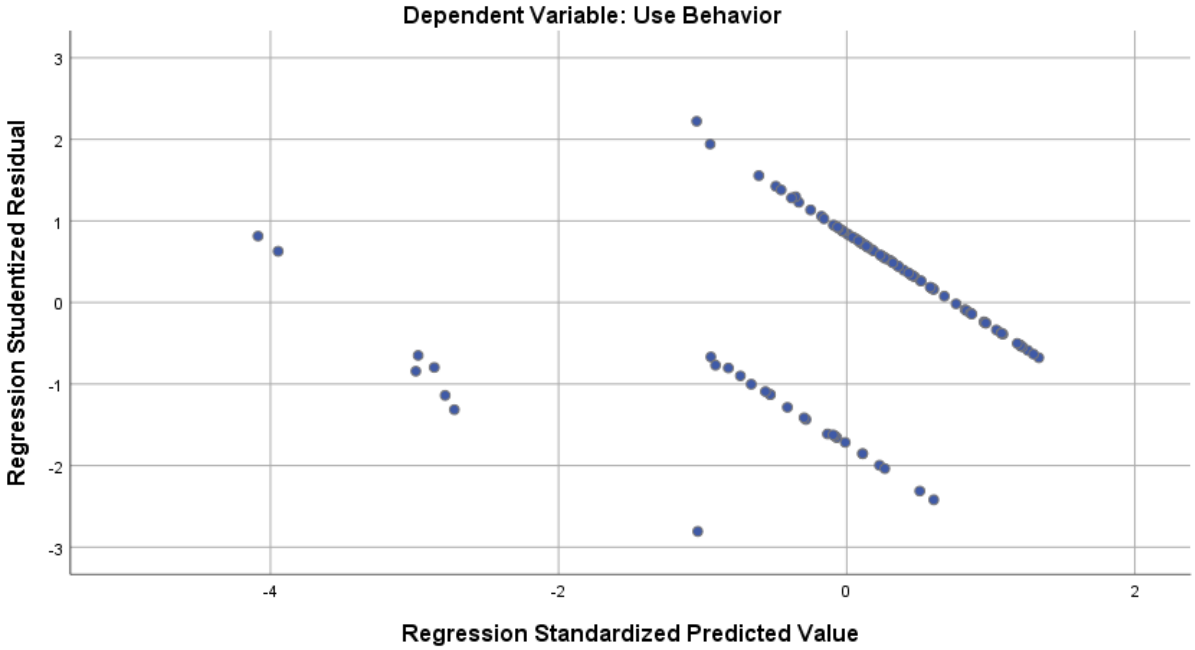

Figure 10: Scatterplot of the residuals for use behavior

UTAUT results summary

RQ1: What factors lead to the acceptance and adoption of Facebook among farmers?

The first regression results suggest that voluntariness of use, performance expectancy, social influence, and gender play a positive role in people's intent to use Facebook, in order of greatest to least contributions to the model. This means that people are likely to accept Facebook if they see it as lying within their locus of control, if they think Facebook is useful, if they are strongly influenced by peers, and if they identify as female. The second regression results suggest that intent to use Facebook, perceived personal network, perceived media richness, and experience determine people's actual use of Facebook. They are shown in the order of greatest to least contributions to the model. Experience played a negative role. That is, using Facebook for a shorter number of years tended to diminish the probability of accepting it. The other items played positive roles, indicating that people are likely to use Facebook more often if intention to use is high, if their friends are also using it, if they have good relationships with friends who actually use Facebook, and if they believe Facebook can get their messages across quickly and accurately.

CMIS Results

CMIS descriptive results

CMIS used the demographic variables gender, age, and education, and the direct experience variables length of time in agriculture, area of agriculture worked in, and farming income in the analysis. Two areas that respondents reportedly worked in, "Agricultural engineering" and "Landscaping & turf," had frequencies of zero and were thus excluded from

the analysis. Table 8 shows the frequencies for these items except gender and age, whose frequencies were the same data as with the UTAUT analysis.

Table 8: CMIS demographic variable frequencies

	Demographic	Frequency	Percent
Education (N=115)	High School graduate/GED certificate	4	3.5%
	Some college	13	11.3%
	2-year college degree	16	13.9%
	4-year college degree	59	51.3%
	Master's degree	21	18.3%
	Doctoral degree	1	0.9%
	Professional degree	1	0.9%
Length of time in agriculture (N=115)	Less than 1 year	1	0.9%
	1-5 years	19	16.5%
	6-10 years	14	12.2%
	11-15 years	17	14.8%
	16-20 years	18	15.7%
	More than 20 years	46	40.0%
Area of agriculture worked in (N=115)	Agri-business	22	19.1%
	Agricultural communications	6	5.2%
	Agricultural education/extension	9	7.8%
	Agronomy/Soils	2	1.7%
	Animal science/Veterinary medicine	1	0.9%
	Farming (animals)	20	17.4%
	Farming (plants)	36	31.3%
	Food science/Human nutrition	2	1.7%
	Insects and entomology	1	0.9%
	Plant science/breeding	1	0.9%
	Natural resources/Environmental sciences	2	1.7%
	Other	13	11.3%
Farming income (N=56)	$0 - $999	6	10.7%
	$1,000 - $9,999	10	17.9%
	$10,000 - $99,999	19	33.9%
	$100,000 - $249,999	12	21.4%
	Over $249,999	9	16.1%

CMIS PCA results

PCA was used to reduce the dimensionality of the salience, beliefs, channel characteristics, channel utility, and actions constructs. Figure 11 and Table 9 shows the initial individual item loadings for these five constructs. The total KMO score before removing the items was 0.847.

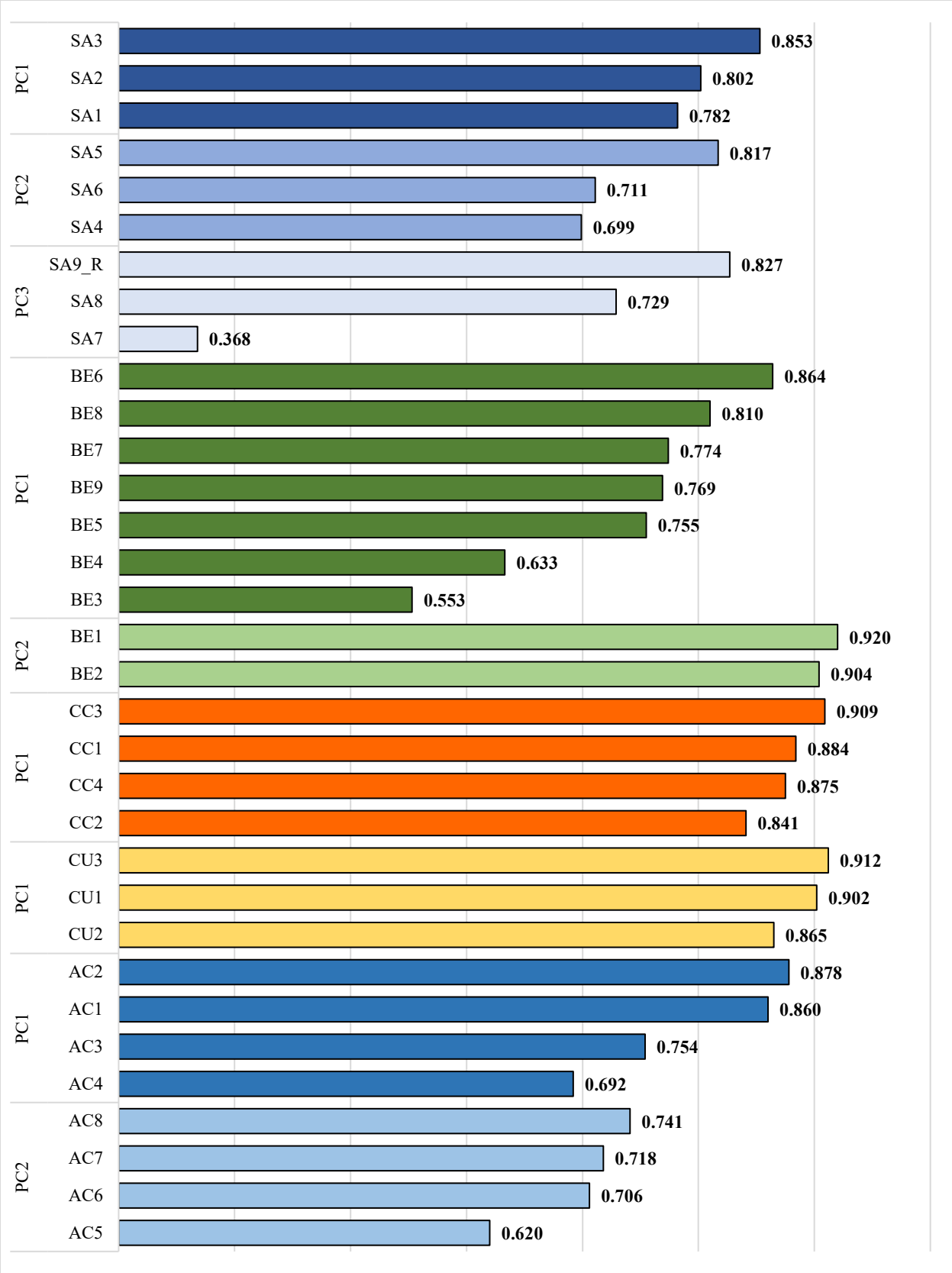

Figure 11: CMIS initial item loadings for the constructs; note: item SA8 loaded negatively

Table 9: CMIS initial item loadings for the constructs

		Component		
	Item	**1**	**2**	**3**
Salience	Having more agriculture information helps me make better decisions. (SA3)	**.853**	.070	-.096
	It is important for me to keep up with the latest agriculture information. (SA2)	**.802**	.031	.157
	I gain confidence when I am more informed about agriculture. (SA1)	**.782**	.137	.010
	I really like the agriculture community on Facebook. (SA5)	.155	**.817**	.016
	My work is highly related with the work of those in my Facebook networks. (SA6)	-.032	**.711**	-.067
	I can freely express my thoughts about agriculture on Facebook. (SA4)	.081	**.699**	-.034
	I do not need the assistance of others to do my job. (SA9_R)	.185	-.034	**.827**
	I can decide for myself how my work should be done. (SA8)	.284	.165	**-.729**
	A lot of people are affected by how well I perform my job. (SA7)	.181	.319	**.368**
Beliefs	By using Facebook, I can help the agriculture industry better serve the public. (BE6)	**.864**	-.077	
	By using Facebook, I can help people in other areas of agriculture do their jobs better. (BE8)	**.810**	-.078	
	By using Facebook, I can help the agriculture industry inform the public. (BE7)	**.774**	-.042	
	By using Facebook, I can develop teams to solve specific problems within the agriculture industry. (BE9)	**.769**	-.174	
	Facebook has the ability to meet most of my agriculture information needs. (BE5)	**.755**	-.110	
	I get agriculture information on Facebook that is helpful to me. (BE4)	**.633**	-.483	
	If I encounter an agriculture problem, most individuals in the Facebook agriculture community help by sharing information. (BE3)	**.553**	-.335	
	It is pointless to communicate using Facebook because no one reads or pays attention to what most people post anyway. (BE1)	-.042	**.920**	
	Nothing ever happens when I communicate using Facebook. (BE2)	-.155	**.904**	
Channel Characteristics	I find the information about agriculture on Facebook very understandable. (CC3)	**.909**		
	I find the information about agriculture on Facebook accurate. (CC1)	**.884**		
	I find the information about agriculture on Facebook clearly presented. (CC4)	**.875**		
	I find the information about agriculture on Facebook well-intentioned. (CC2)	**.841**		
Channel Utility	Facebook is a valuable source of agriculture information. (CU3)	**.912**		
	Facebook is important to me because it helps me find information about agriculture. (CU1)	**.902**		
	It is easy to get agriculture information on Facebook. (CU2)	**.865**		

Table 9 (cont.)

		Component		
	Item	**1**	**2**	**3**
Actions	I talk to a lot of people about agriculture on Facebook. (AC2)	**.878**	.142	
	I send a lot of messages about agriculture on Facebook. (AC1)	**.860**	.049	
	I use Facebook to obtain others' opinions about agriculture. (AC3)	**.754**	.274	
	I use Facebook to find solutions to agriculture problems. (AC4)	**.692**	.453	
	I seek agriculture information on Facebook only when I need to. (AC8)	-.134	**.741**	
	I use Facebook to help make agriculture-related purchase decisions. (AC7)	.451	**.718**	
	I use Facebook to find background information about agriculture. (AC6)	.420	**.706**	
	I use Facebook to get updates or news about agriculture. (AC5)	.491	**.620**	

Item SA9 was reverse-coded at first, but the original responses were used so it would load positively on its component when item SA7 was removed. Item SA7 was removed due to low loading, resulting in a higher Cronbach's alpha score. Items SA1, SA2, and SA3 loaded on component 1. Items SA4, SA5, and SA6 loaded on component 2. Items SA8 and SA9 loaded on component 3. Items BE1_R and BE2_R were reverse-coded because the questions were negatively phrased. This led to all items loading positively on their components. Items BE3 – BE9 loaded on component 1; items BE1_R and BE2_R loaded on component 2. Channel characteristics and channel utility items all loaded high, and each item loaded within one component. Items AC1–AC4 loaded on component 1 and items AC5–AC8 loaded on component 2. Because the loadings changed only for salience and beliefs, they were the only constructs reported in Table 10 to avoid redundant information from Table 9. Figure 12 and Table 10 show the final individual item loadings for the two constructs whose loadings changed after one item was removed and the negatively phrased items were and reverse-coded. The total KMO score registered at 0.851. Cronbach's alpha scores are shown in Table 11. All components for all constructs were used in the initial regressions.

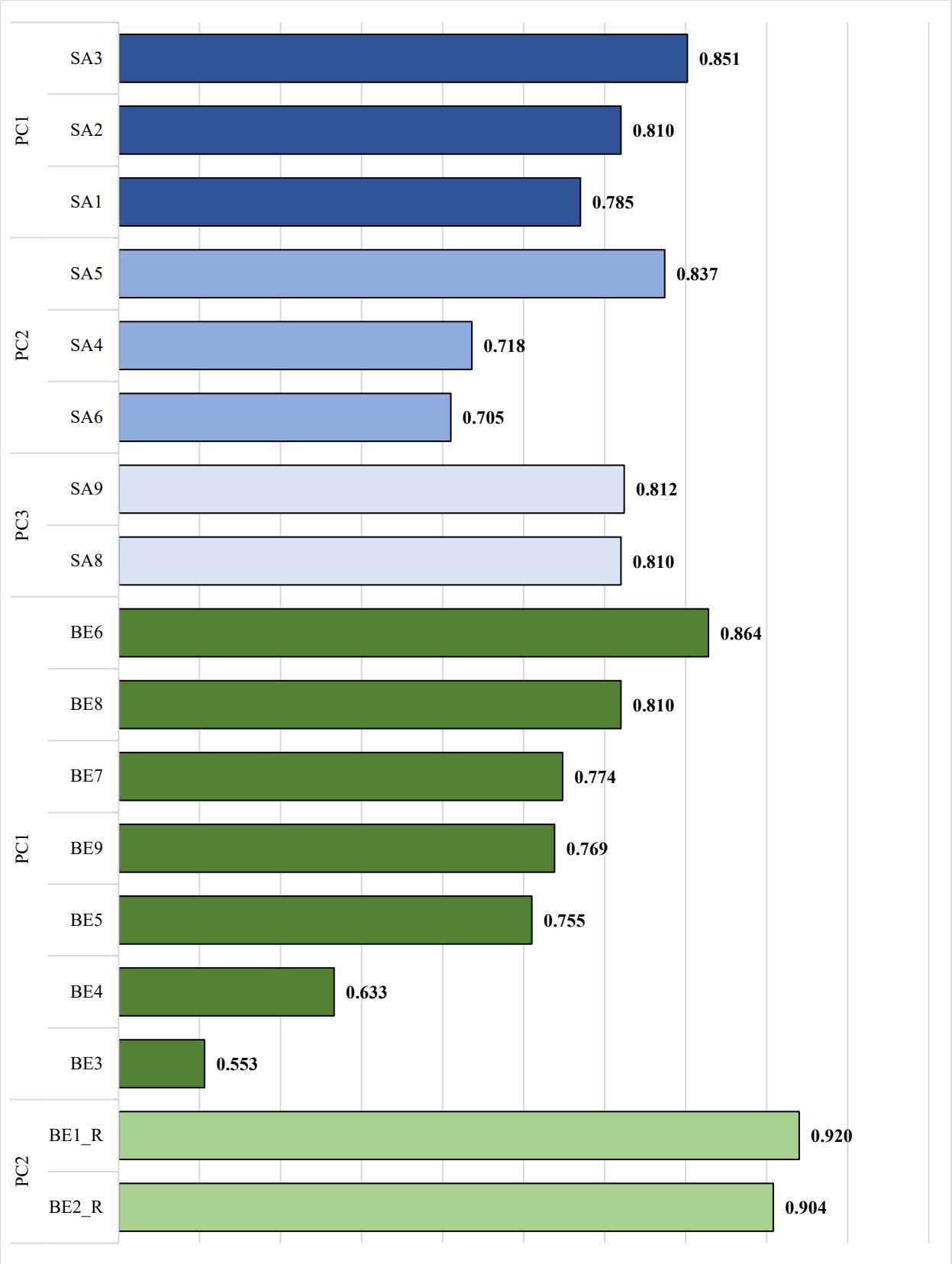

Figure 12: CMIS final item loadings for salience and beliefs constructs

Table 10: CMIS final item loadings for salience and beliefs constructs

		Component		
	Item	**1**	**2**	**3**
Salience	Having more agriculture information helps me make better decisions. (SA3)	**.851**	.069	.120
	It is important for me to keep up with the latest agriculture information. (SA2)	**.810**	.027	-.119
	I gain confidence when I am more informed about agriculture. (SA1)	**.785**	.141	.010
	I really like the agriculture community on Facebook. (SA5)	.169	**.837**	-.014
	I can freely express my thoughts about agriculture on Facebook. (SA4)	.088	**.718**	.026
	My work is highly related with the work of those in my Facebook networks. (SA6)	-.025	**.705**	.097
	I do not need the assistance of others to do my job. (SA9)	-.227	.012	**.812**
	I can decide for myself how my work should be done. (SA8)	.244	.097	**.810**
Beliefs	By using Facebook, I can help the agriculture industry better serve the public. (BE6)	**.864**	.077	
	By using Facebook, I can help people in other areas of agriculture do their jobs better. (BE8)	**.810**	.078	
	By using Facebook, I can help the agriculture industry inform the public. (BE7)	**.774**	.042	
	By using Facebook, I can develop teams to solve specific problems within the agriculture industry. (BE9)	**.769**	.174	
	Facebook has the ability to meet most of my agriculture information needs. (BE5)	**.755**	.110	
	I get agriculture information on Facebook that is helpful to me. (BE4)	**.633**	.483	
	If I encounter an agriculture problem, most individuals in the Facebook agriculture community help by sharing information. (BE3)	**.553**	.335	
	It is pointless to communicate using Facebook because no one reads or pays attention to what most people post anyway. (BE1_R)	.042	**.920**	
	Nothing ever happens when I communicate using Facebook. (BE2_R)	.155	**.904**	

Table 11: CMIS Cronbach's alpha scores for the constructs

Construct	**Cronbach's alpha**
Salience	.613
Beliefs	.862
Channel Characteristics	.900
Channel Utility	.873
Actions	.869

CMIS multiple linear regression

First, regression was performed using salience, beliefs, and channel characteristics as predictors of channel utility (Facebook utility). Next, demographics and direct experience variables were added. No demographics or direct experience variables were deemed significant, except the "having a professional degree" option under education. Only one participant selected this answer, so the item was removed from the model, and the regression was re-run because it is

most likely an outlier in this sample (even though it was not deemed a statistical outlier). Table 12 shows the final regression with only the significant items. This resulted in 59.2% of the variance explained for channel utility, with the model itself being significant at p <. 001. The beliefs principal component 1 positively contributed the most to the model; the salience principal component 1 contributed slightly negatively to the utility scores.

Table 12: CMIS regression for channel utility;
N=115, Adjusted R^2 = .592 (*p < .05; ***p < .001)

	B	**SE B**	**B**	***p***	**VIF**
Constant	1.247E-16	0.060		1.000	
Salience PC1	-.132	.062	-.132	.037*	1.083
Beliefs PC1	.501	.065	.501	.000***	1.185
Beliefs PC2	.335	.062	.335	.000***	1.069
Channel Characteristics	.334	.067	.334	.000***	1.251

Figure 13 shows the normal p-plot of the regression standardized residuals while Figure 14 shows a scatterplot of the residuals. Only one point was outside of the normalized -3 to 3 range with a residual of -3.049. Because there is only one outlier on the tail end, it was not removed from the regression. Linearity was confirmed with these figures.

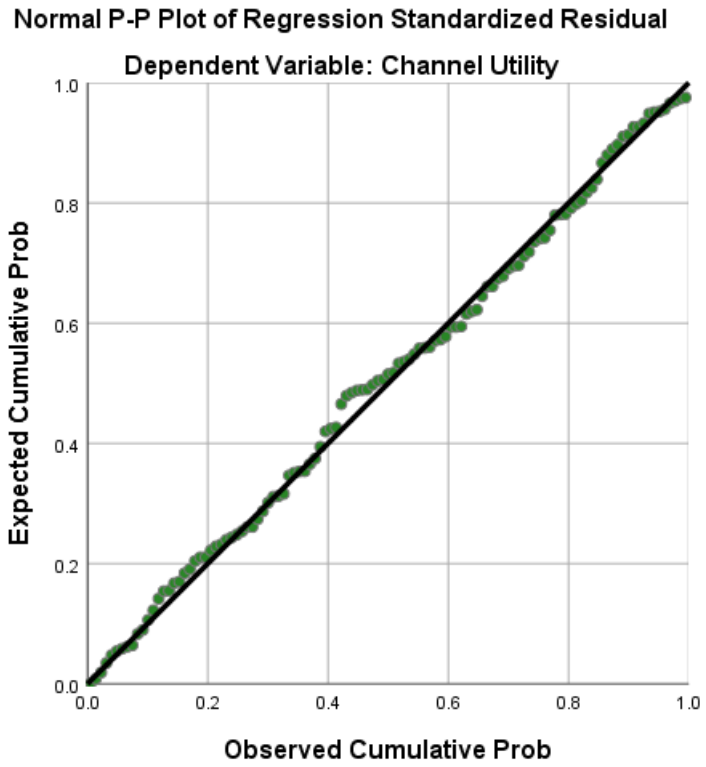

Figure 13: Normal p-p plot for regression standardized residuals for channel utility

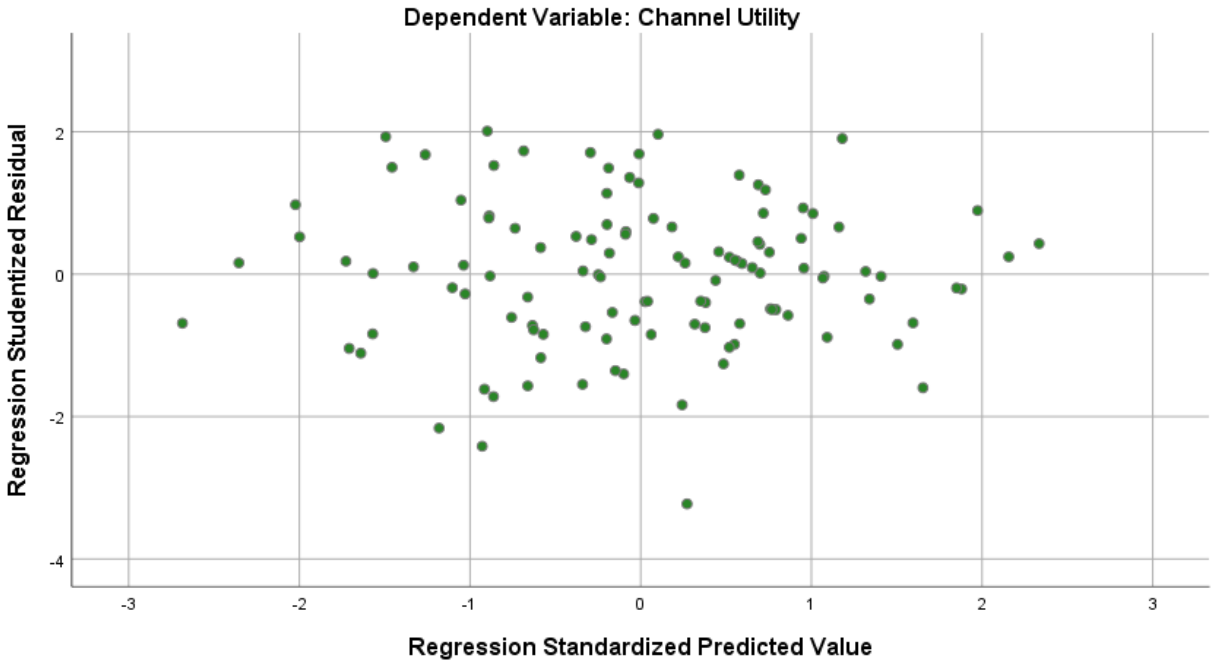

Figure 14: Scatterplot of the residuals for channel utility

Regression was then performed using channel characteristics, channel utility, and the interaction term created from those two as predictors of information seeking actions on Facebook. No demographics or direct experience variables were used in this regression. Two final regressions were selected because the actions construct is composed of two principal components. Tables 13 and 14 show the final two regressions with only the significant items. As shown in Table 13, regression resulted in 23.1% of the variance explained for actions principal component 1, with the model itself being significant at $p < .001$. The regression results on Table 14 gave 25.0% of the variance explained for actions principal component 2, with the model itself being significant at $p < .001$. The findings show that channel utility was the only significant contributor to information seeking actions.

Table 13: CMIS regression for actions principal component 1;
N=115, Adjusted $R^2 = .231$ (***$p < .001$)

	B	**SE B**	**β**	***p***	**VIF**
Constant	-2.854E-17	.082		1.000	
Channel Utility	.488	.082	.488	.000***	1.000

Table 14: CMIS regression for actions principal component 2;
N=115, Adjusted $R^2 = .250$ (***$p < .001$)

	B	**SE B**	**β**	***p***	**VIF**
Constant	1.590E-17	.081		1.000	
Channel Utility	.506	.081	.506	.000***	1.000

Figures 15 and 17 show the normal p-plot of the regression standardized residuals while Figures 16 and 18 show scatterplots of the residuals for the two models. No outliers were detected in the two action regression models. Linearity is confirmed with these figures.

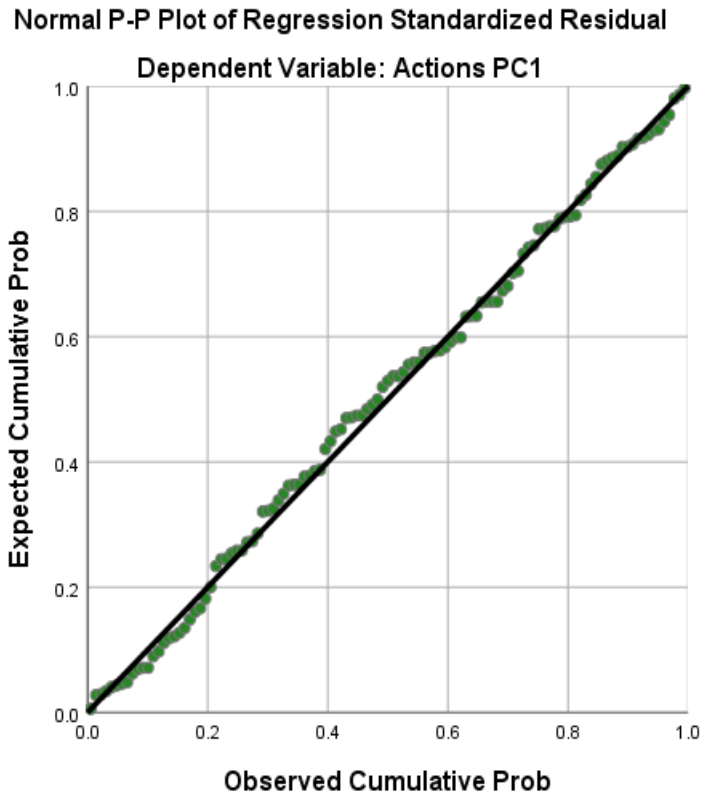

Figure 15: Normal p-p plot for regression standardized residuals for actions principal component 1

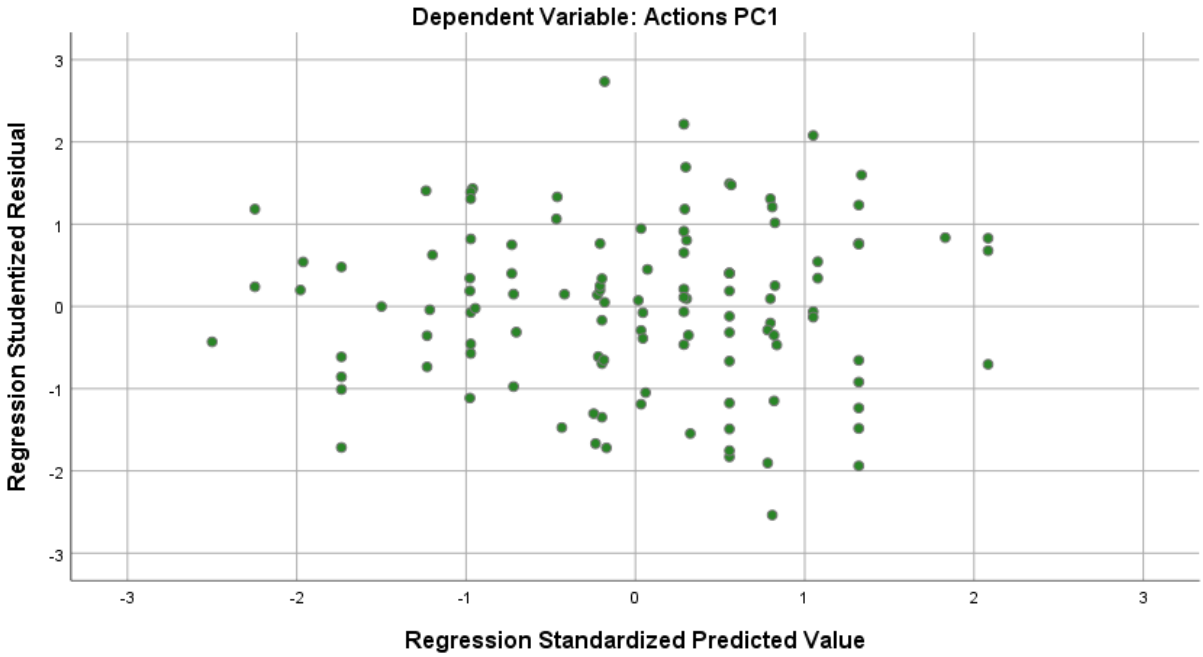

Figure 16: Scatterplot of the residuals for actions principal component 1

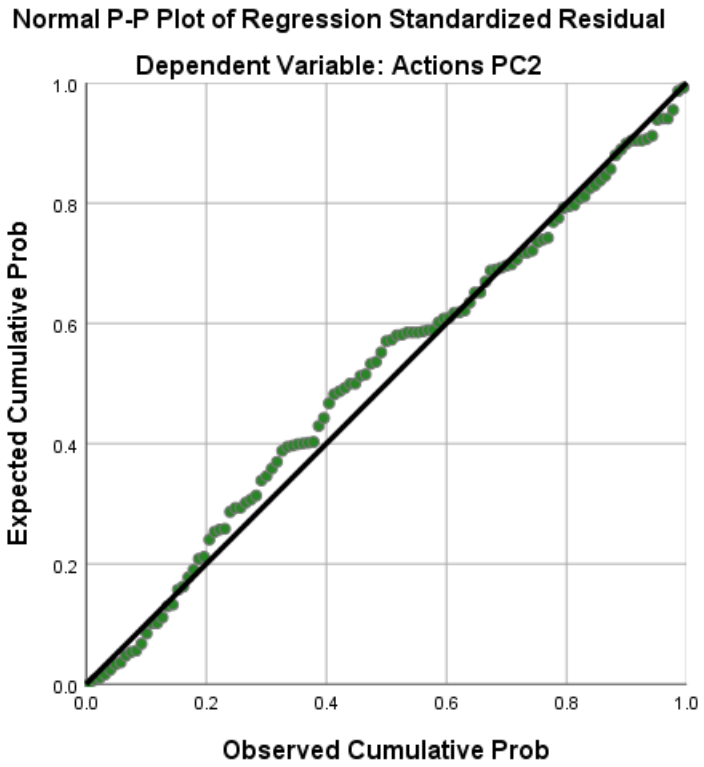

Figure 17: Normal p-p plot for regression standardized residuals for actions principal component 2

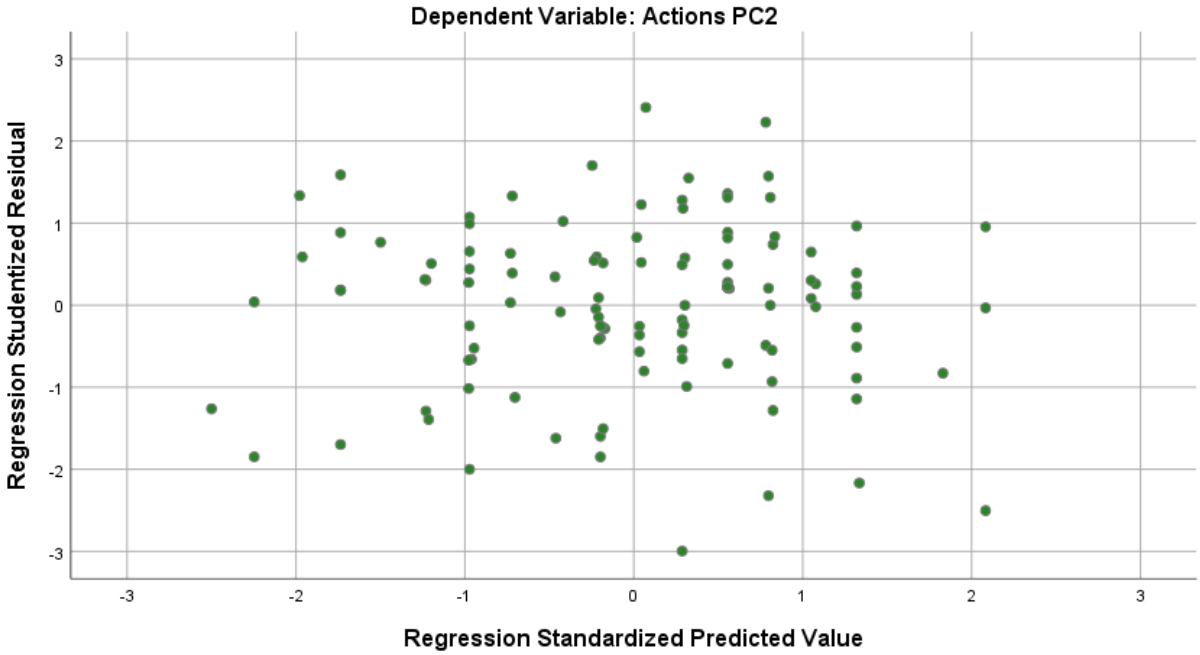

Figure 18: Scatterplot of the residuals for actions principal component 2

CMIS result summary

RQ2: What do farmers use Facebook for and to what extent do they use it to seek information about their farming enterprise?

The first regression results suggest that beliefs, channel characteristics, and salience influence Facebook (channel) utility, in order of greatest to least contributions to the model. Salience played a slightly negative role, suggesting that the increased importance people ascribe to having information to perform their jobs diminished the value they attach to Facebook as a source of information. The other items played positive roles. That is, people found greater value in using Facebook for agriculture information if they have strong beliefs about the importance of agriculture and they deem that useful information can be derived from Facebook. The second regression results suggest that people are more likely to seek information from Facebook if they think that Facebook can indeed provide such information.

U&G analysis

Correlations were run between GS and GO items to determine the strength of the relationships between what people were looking to gain and what they believe they obtained from Facebook use. Table 15 shows the correlations between the five GS and GO constructs: general information seeking (GI), decisional utility (DU), entertainment (EN), interpersonal utility (IU), and parasocial interaction (PI).

Table 15: U&G correlation table between GS and GO items (**p < .01, *p < .05)

	GS Items	Pearson Correlation	GO Items
General Information Seeking	I use Facebook to keep up with current events.	.641**	Using Facebook helps me keep up with current events.
	I use Facebook because I trust the information it gives.	.526**	My Facebook network gives me trustworthy information.
	I use Facebook because it offers so much information about agriculture that I can use.	.747**	Facebook offers so much information about agriculture that I can use.

Table 15 (cont.)

	GS Items	Pearson Correlation	GO Items
Decisional Utility	I use Facebook to monitor what government officials are doing.	.779**	Facebook helps me monitor what government officials are doing.
	I use Facebook to help me determine the important issues of the day.	.634**	Facebook helps me make up my mind about the important issues of the day.
	I use Facebook to find out about issues affecting people like myself.	.641**	Facebook helps me find out about issues affecting people like myself.
Entertainment	I use Facebook because it's often entertaining.	.548**	Facebook content is often entertaining.
	I use Facebook because it's often dramatic.	.199*	Facebook content is often dramatic.
	I use Facebook because it's often exciting.	.531**	Facebook content is often exciting.
Interpersonal Utility	I use Facebook to find information and opinions that support my own viewpoints.	.498**	Facebook helps me find information and opinions that support my own viewpoints.
	I use Facebook so I can pass information along.	.685**	Facebook helps me pass information along.
	I use Facebook to learn about interesting topics that I can talk about with others.	.619**	Facebook gives me interesting topics to talk about with others.
Parasocial Interaction	I use Facebook because it gives a human quality to the news.	.674**	Facebook gives a human quality to the news.
	I use Facebook to compare my own ideas with those of others.	.565**	Facebook allows me to compare my own ideas with those of others.
	I use Facebook because I like interacting with people I know.	.587**	Facebook allows me to interact with people I know.

PCA was used to combine the GS items and GO items into constructs. Tables 16 and 17 show the item loadings for the GS and GO groupings based on their principal component groups. The total KMO score was 0.871 for GS and 0.888 for GO. All items were retained to understand the roles of all these items in the newly constructed constructs. Cronbach's alpha for the GS items was 0.917; for the GO items, it was 0.904.

Table 16: U&G GS item loadings

	Component		
Item	**1**	**2**	**3**
I use Facebook because it offers so much information about agriculture that I can use. (GI3)	**.781**	.172	.246
I use Facebook to help me determine the important issues of the day. (DU2)	**.754**	.295	.148
I use Facebook to keep up with current issues and events. (GI1)	**.741**	.171	.123
I use Facebook to find out about issues affecting people like myself. (DU3)	**.719**	.460	.201
I use Facebook to monitor what government officials are doing. (DU1)	**.708**	.317	-.162

Table 16 (cont.)

I use Facebook because I trust the information it gives. (GI2)	.666	.080	.353
I used Facebook because it gives a human quality to the news. (PI1)	**.534**	.383	.355
I use Facebook to get interesting topics that I talk about with others. (IU3)	.274	**.864**	.211
I use Facebook to find information and opinions that support my own viewpoints. (IU1)	.287	**.785**	.237
I use Facebook so I can pass information along. (IU2)	.225	**.716**	.096
I use Facebook to compare my own ideas with those of others. (PI2)	.315	**.673**	.225
I use Facebook because it's often entertaining. (EN1)	.147	.018	**.868**
I use Facebook because it's often exciting. (EN3)	.382	.348	**.691**
I use Facebook because it's often dramatic. (EN2)	.080	.370	**.631**
I use Facebook because I like interacting with people I know. (PI3)	.102	.426	**.459**

Table 17: U&G GO item loadings

	Component		
Item	**1**	**2**	**3**
Facebook helps me make up my mind about the important issues of the day. (DU2)	**.787**	.237	.109
Facebook helps me find information and opinions that support my own viewpoints. (IU1)	**.779**	.245	.102
Facebook offers so much information about agriculture that I can use. (GI3)	**.774**	.304	-.062
My Facebook network gives me trustworthy information. (GI2)	**.767**	.041	.243
Facebook helps me monitor what government officials are doing. (DU1)	**.702**	.395	.024
Using Facebook helps me keep up with current issues and events. (GI1)	**.518**	.505	.136
Facebook helps me pass information along. (IU2)	**.385**	.319	.238
Facebook allows me to compare my own ideas with those of others. (PI2)	.286	**.762**	.136
Facebook allows me to interact with people I know. (PI3)	.026	**.747**	.349
Facebook gives me interesting things to talk about with others. (IU3)	.429	**.662**	.203
Facebook helps me find out about issues affecting people like myself. (DU3)	.570	**.577**	.117
Facebook gives a human quality to the news. (PI1)	.446	**.570**	-.065
Facebook content is often entertaining. (EN1)	.044	.248	**.825**
Facebook content is often exciting. (EN3)	.365	.127	**.758**
Facebook content is often dramatic. (EN2)	-.015	.064	**.755**

Correlations were run between select demographic variables and the newly constructed GS and GO principal components to determine the strength of the relationships between people's experiences with Facebook and the gratifications they reportedly needed and obtained from Facebook use. Only significant correlations are shown in Table 18.

Table 18: U&G correlation table demographics and components (p<.01**, p<.05*)

Demographic	Pearson Correlation	Component
How often do you use Facebook?	.261**	GS PC1
	.227*	GS PC2
	.311**	GO PC1
	.260**	GO PC2
How would you rate your current social media skills?	.209*	GS PC1
	.254**	GS PC2
	.211*	GS PC3
	.290**	GO PC1
	.217*	GO PC2

Table 18 (cont.)

	Pearson Correlation	Component
How would you rate your current social media skills?	.239*	GO PC3
Do you post questions about agriculture on Facebook?	-.228*	GS PC1
	-.218*	GS PC2
	-.294**	GO PC1
Facebook agriculture content and helpfulness: Groups (N=112)	.210*	GS PC1
	.207*	GO PC1
	.289**	GO PC2
Facebook agriculture content and helpfulness: Pages (N=111)	.232*	GS PC1
	.262**	GO PC1
	.191*	GO PC2

U&G results summary

RQ3: What needs are answered and what gratifications are derived from farmers' use of Facebook?

The correlations between GS and GO items were all statistically significant and positive. There were many strong positive correlations between what people sought on Facebook and what they feel they obtained from using it. The highest correlation (0.779) was between the GS and GO item to monitor government officials; the second-highest correlation (0.747) was between the GS and GO regarding use of Facebook for agriculture information. "Using Facebook because it is dramatic" registered the lowest GS-GO correlation (0.199), indicating that respondents believed Facebook is providing useful information that enables them to monitor political affairs and find agriculture information. However, their thoughts on whether Facebook provides dramatic content showed no clear pattern.

The PCA results for GS items showed three components: component 1 (PC1) deals with information seeking for decision making, component 2 (PC2) deals with information seeking for the sake of passing information on to others, and component 3 (PC3) deals with the entertainment aspect of Facebook use. The PCA results for GO items also showed three components: PC1 deals with information seeking to help with decision making, similar to the GS

results. PC2 mostly deals with talking to other people and trying to get information from Facebook to understand others, and PC3 deals with the entertainment facet of using Facebook.

The last set of correlations between demographic results and PCA results showed that in general, the information seeking and personal aspects of using Facebook had positive relationships with people's use of Facebook, their social media skills, and the perceived utility of Facebook groups and pages. One set of correlations showed a negative relationship between those who posted questions about agriculture and Facebook use. The scores for GS PC1, GS PC2, and GO PC1 went down if people reportedly posted questions on Facebook. This suggests that people may have a more critical view of Facebook's ability to provide them with the information they need when they use a direct method of seeking information.

Facebook Data Mining Results

Data mining of 35 Facebook groups and 51 Facebook pages resulted in 2,471 posts, comments, and replies across 10 domains. The 11th domain, "Other," was not used because the coders were able to fit each response into one of the ten pre-identified domains. There was substantial agreement between the two coders' judgements, with a Cohen's kappa value of 0.615, $p < .001$, according to Landis and Koch's (1977) guidelines for significance. The two coders discussed disagreements on which domain a text should be placed under until all texts were placed in an agreed-upon domain.

Post totals' analysis results

A total of 2,471 text posts were collected. This translated to 2,473 individual lines of text parsed after a couple of comments were split due to the R code parsing procedure. Table 19

shows the number of comments collected in each domain. Animals had the largest number; Energy registered the smallest number.

Table 19: Post totals in each domain

Domain	Total
Animals	846
Finance, Economics, and Trade	798
Crops and Soils	236
Family and Community Affairs	185
Farm Equipment	182
Communication/Information Technology	108
Environment and Natural Resources	53
Family and Community Health/Nutrition	53
Farm Technology	7
Energy	5

Word analysis results

The sample ended up with a total of 47,973 words before the text was cleaned, which involved removing numbers, whitespaces, stop words (e.g., the, and), and performing stemming. Stemming is when you remove the inflections of words to reduce them to their root, which may or may not be an actual word (ex: combin = combine/combines). A total of 16,517 words were left after cleaning the text; 4,377 unique words were identified. Figure 19 shows the total number of words falling in each domain. Animals had the largest number of words, nearly twice as much as the number of words under Finance. Figure 20 shows the top 10 words appearing most frequently in all domains. The stem "locat" had the largest frequency, which includes words such as "located" and "location." Animal-related words (e.g., "dog," "hors" (horse/horses), "breed," and "sheep") were also frequently used. Table 20 shows each domain and the top 10 words found in each. The Farm Technology domain had a lot of words with a frequency of one. Thus, a few words that were deemed most germane were chosen to depict this domain. Figure 21 shows the tf-idf scores for the top 10 words in each domain. A few domains have more than 10 words

because they had the same tf-idf score. Two names, specifically referring to users, were removed from the dataset. Another name, which referred to the author of a book, was left in the analysis.

Bigram analysis results

There were 47,963 bigrams (two words that are adjacent to one another) before the text was cleaned; 5,727 bigrams were retained after cleaning the text. A total of 5,252 unique bigrams were identified. Figure 22 shows the total number of bigrams in each domain. Animals had the largest number and Farm Technology had the least. Figure 23 shows the top 12 bigram frequencies for all domains. The bigrams "locat price" and "price price" were tied for the highest frequency, and the stems "locat" and "price" showed up in five of the top 12 bigrams. Table 21 shows all domains and the top 10 bigrams in each. A few bigrams with only numbers in them were removed. Figure 24 shows the network of all bigrams with word frequencies equal to or greater than two.

Data mining results summary

The results suggest that the respondents were mostly searching for information related to animals, finances, and crops. Where to find some farming items and how much they cost were most frequently searched. The words and bigrams in each domain fit nicely, making it easy to identify a domain just by looking at the items in it. The bigram network also shows inherent connections. For example, "ISO" which stands for "in search of," is connected with a wide variety of words such as grass, hay, barn, round (then connected to bale), and price. There is also a long list of connections related to colors, ages, and animal genetics. The network provides a more detailed insight into people's information seeking behaviors on Facebook.

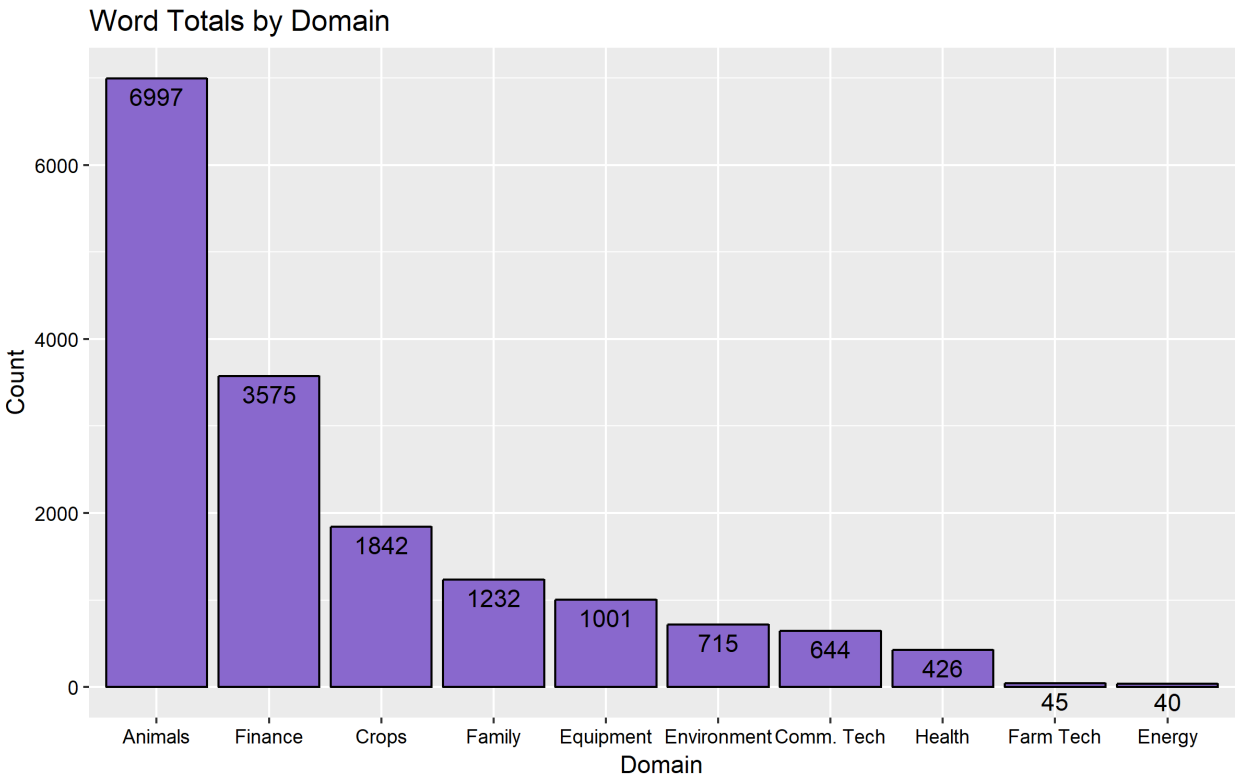

Figure 19: Total amount of words in each domain

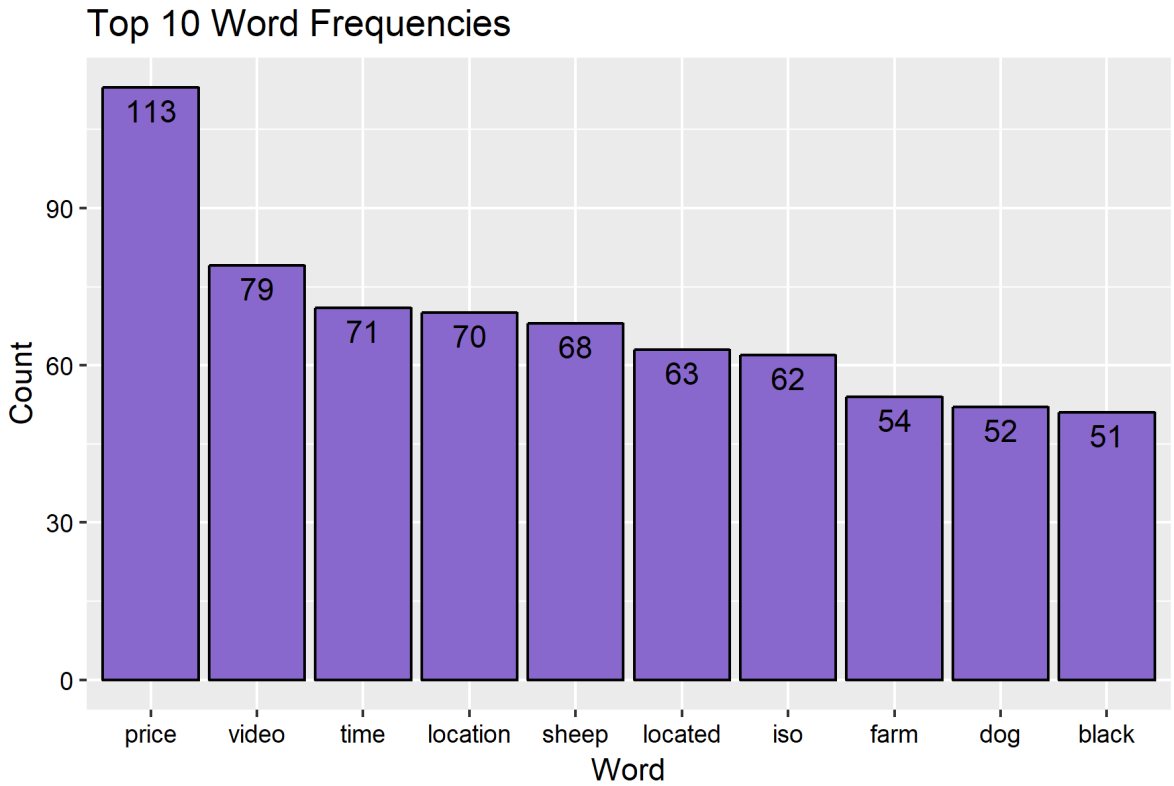

Figure 20: Top 10 words in all domains

Table 20: Top 10 words in each domain

Domain	Word	Count	Domain	Word	Count
Crops and Soils	Plant	63	**Animals**	Dog	84
	Crop	36		Video	71
	Tree	24		Sheep	62
	Grow	23		Breed	61
	Soil	21		Lamb	59
	Garden	19		Hors	47
	Corn	16		Feed	44
	Fall	16		Black	43
	Seed	16		Color	42
	Leav	14		Spot	42
Farm Equipment	Tractor	17	**Energy**	Farm	3
	Wd	15		Land	3
	Front	10		Solar	3
	Frame	9		Farmer	2
	Combin	7		Leas	2
	Trailer	7		Panel	2
	Wd45	7		Renew	2
	Engin	6		Barrel	1
	Guy	6		Close	1
	Model	6		E85	1
	Tractor	17		Farm	3
Finance, Economics, and Trade	Price	124	**Environment and Natural Resources**	Climat	13
	Locat	111		Chang	8
	Iso	48		Bag	6
	Sale	35		Groom	6
	Sell	35		Product	6
	Farm	31		Trail	6
	Buy	30		Sustain	5
	Hors	28		Burn	4
	Time	19		Conserv	4
	Farmer	17		Croix	4
Farm Technology	Home	2	**Communication/ Information Technology**	Articl	11
	Phone	2		Post	10
	System	2		Watch	9
	Analysi	1		Share	8
	Camera	1		Book	7
	Dna	1		Link	7
	Internet	1		Live	7
	Monitor	1		Video	7
	Photo	1		Miss	5
	Video	1		News	5
Family and Community Health/ Nutrition	Eat	6	**Family and Community Affairs**	Farm	17
	Food	6		Farmer	13
	Vitamin	6		Question	13
	Health	5		Meet	12
	Iodin	5		Food	11
	Defici	4		Organ	11
	Doctor	4		Csa	10
	Gmo	4		Inform	9
	Post	4		Plan	9
	Recip	4		Time	9

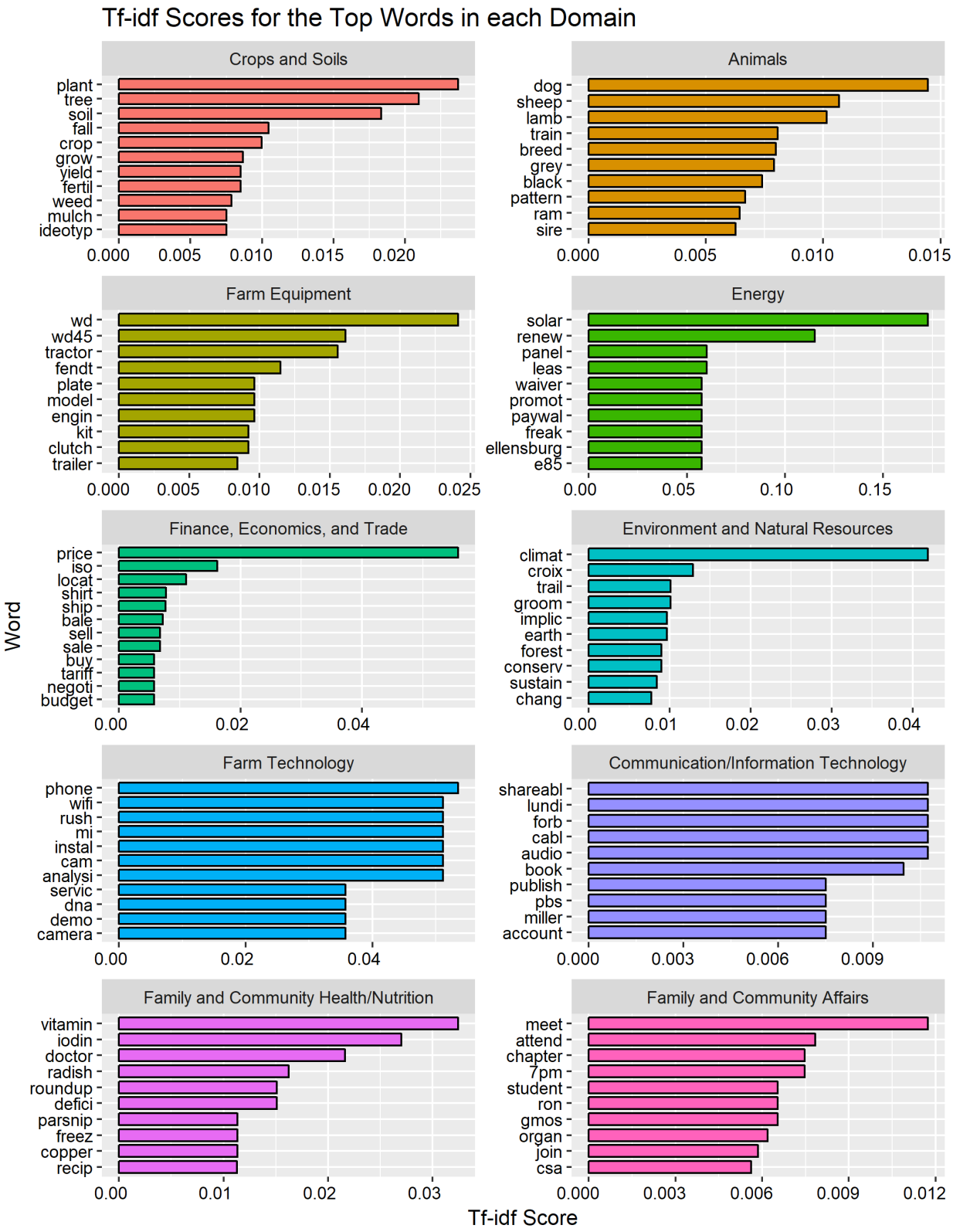

Figure 21: Tf-idf scores for the top words in each domain

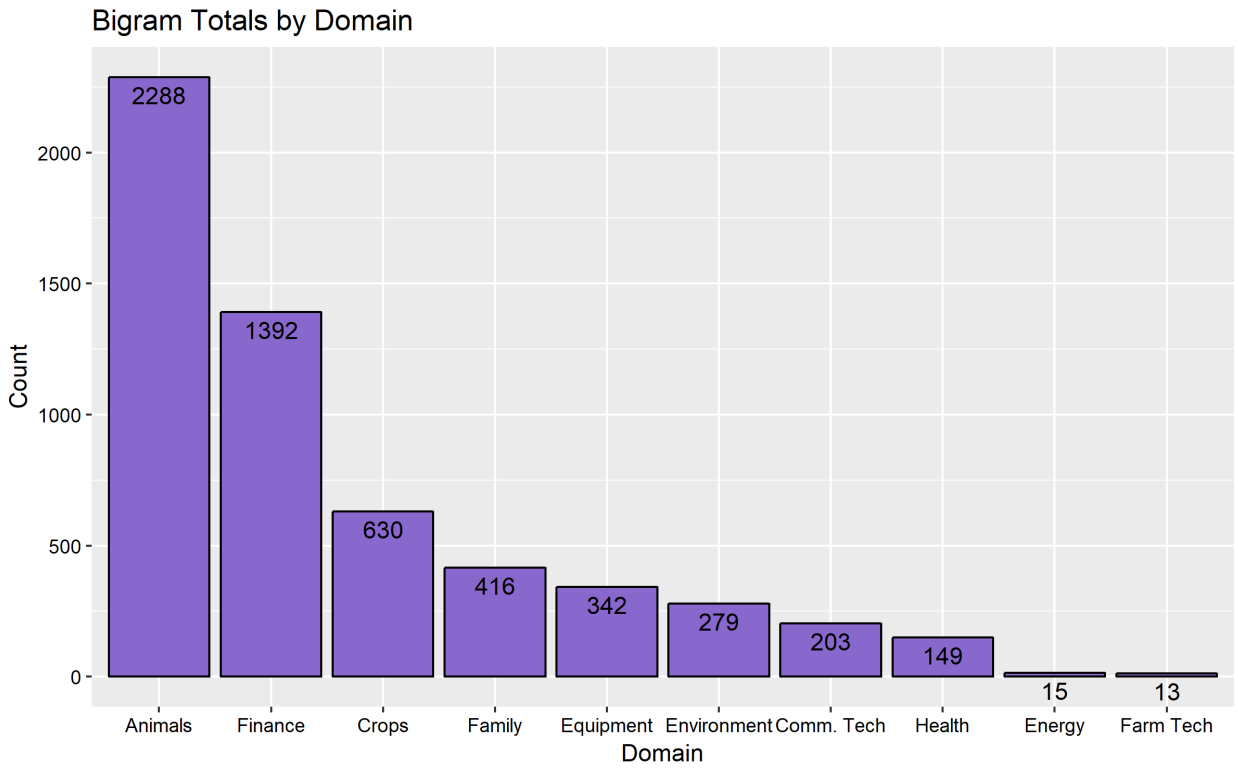

Figure 22: Total amount of bigrams in each domain

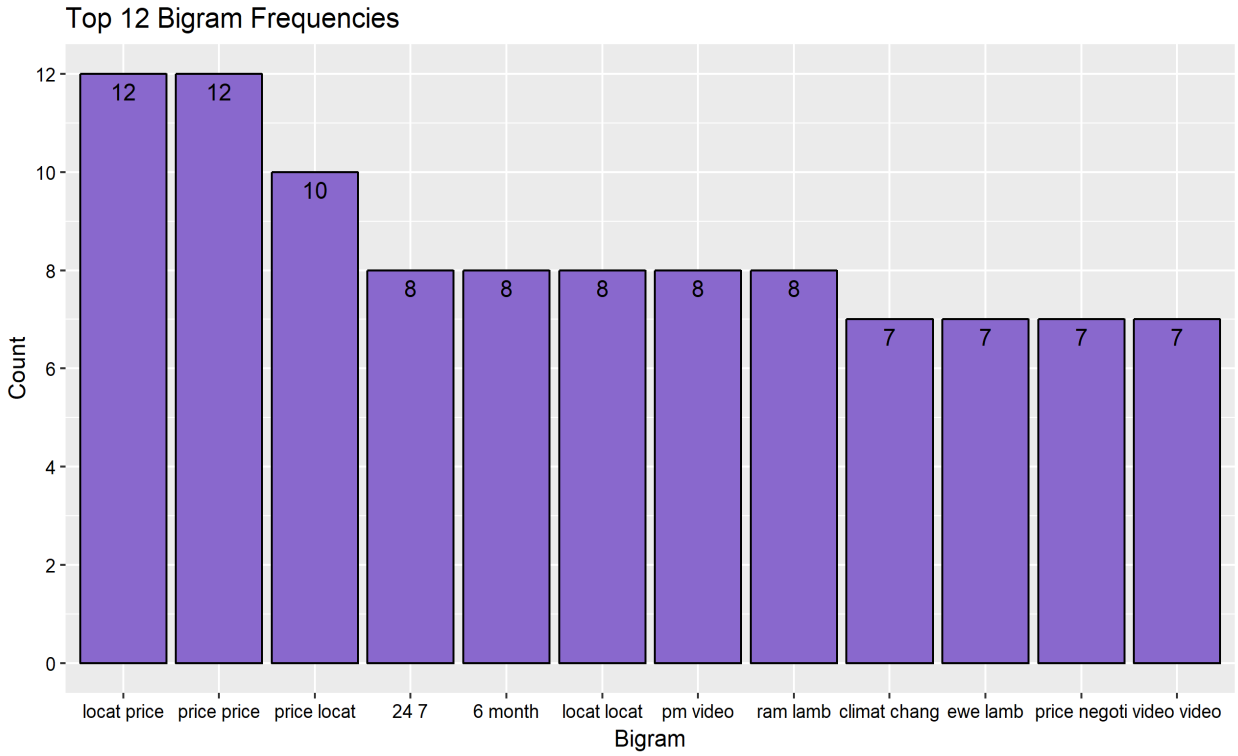

Figure 23: Top 12 bigrams in all domains

Table 21: Top 10 bigrams in each domain

Domain	Bigram	Count	Domain	Bigram	Count
Crops and Soils	crop ideotyp	6	**Animals**	24 7	8
	soil test	4		pm video	8
	cover crop	3		ram lamb	7
	fan jet	3		video video	7
	fig tree	3		6 month	6
	synthet fertil	3		ewe lamb	6
	2 gallon	2		babydol southdown	5
	appl tree	2		straight line	5
	black eye	2		age grey	4
	breed method	2		black ram	4
Farm Equipment	hand clutch	3	**Energy**	solar panel	2
	alli chalmer	2		farm freak	1
	combin run	2		farm land	1
	dark comb	2		farmer stay	1
	oil filter	2		freak solar	1
	plastic foundat	2		land yeah	1
	shaft come	2		leas payment	1
	swarm trap	2		panel farm	1
	tripl rins	2		promot renew	1
	wd 45	2		protect land	1
	wd 88510	2		renew energi	1
Finance, Economics, and Trade	locat price	12	**Environment and Natural Resources**	climat chang	7
	price price	12		st croix	4
	price locat	9		leav st	3
	locat locat	7		climat scienc	2
	price negoti	7		food system	2
	squar bale	6		methan gas	2
	grass hay	5		middl class	2
	round bale	5		mitig climat	2
	central illinoi	3		natur product	2
	farmer market	3		plastic bag	2
Farm Technology	10 minut	1	**Communication/ Information Technology**	auction live	2
	75 mi	1		color sheep	2
	advic opinion	1		invit peopl	2
	camera system	1		live feed	2
	distanc 75	1		nation news	2
	dna analysi	1		post link	2
	mi max	1		timeless color	2
	monitor video	1		valley pbs	2
	rush home	1		world congress	2
	studi build	1		2 shepherd	1
Family and Community Health/ Nutrition	iodin defici	4	**Family and Community Affairs**	farm bureau	3
	copper sulfat	2		actual research	2
	egg recip	2		anim care	2
	food vitamin	2		board meet	2
	infant formula	2		factori farm	2
	instant pot	2		feel free	2
	menstrual pain	2		ffa chapter	2
	organ farm	2		march 4th	2
	test gmo	2		10 day	1
	2018 flu	1		2020 champion	1

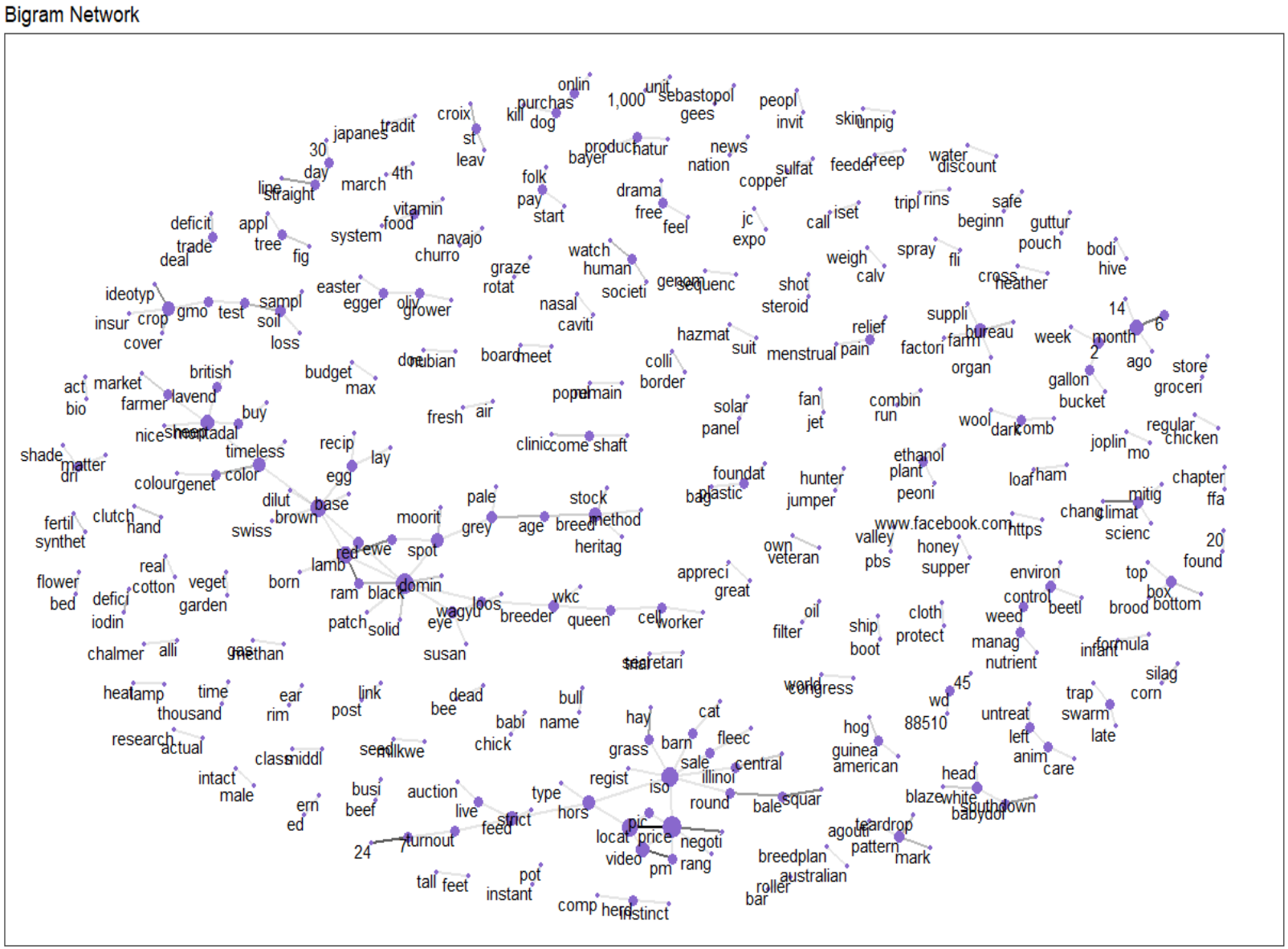

Figure 24: Network graph of bigrams

CHAPTER 5: DISCUSSION AND CONCLUSIONS

The present study sought to fill the gap in the literature regarding how social media users within the agriculture community accept and use Facebook as a social networking site, the information seeking behaviors they exhibit while using Facebook, and the uses and gratifications they derive and obtain from using this social media platform. This study aims to add to the theoretical foundations that aim to predict and explain technology acceptance, use, information seeking behaviors, and uses and gratifications regarding a popular communication technology. It also added to the literature on research methods by assessing the feasibility and validity of a revised UTAUT model and CMIS model as they are applied in understanding audience acceptance and use of Facebook within the agriculture domain.

This study posed three research questions involving the acceptance and use of Facebook, information seeking behaviors on Facebook, and uses and gratifications derived from Facebook use by farmers and farm families in Illinois. A mixed-methods approach combined the use of survey data and a content analysis of text data or posts from public and group Facebook pages. This chapter draws conclusions, discusses the implications of the findings and conclusions, outlines the limitations of the study, and lists the recommendations for future work.

Summary of Findings and their Implications

RQ1: What factors lead to the acceptance and adoption of Facebook among farmers?

The results of regression tests revealed several statistically significant factors that led to the acceptance and use of Facebook among the survey respondents. The findings show that intention to use Facebook (acceptance) was influenced by four variables: voluntariness of use,

performance expectancy, being female, and social influence. Of these, voluntariness exerted the greatest influence, a finding that aligns with those of Karahanna, Straub, and Chervany (1999) who examined the factors that had a bearing on the use of Windows computers among office workers. The latter scholars observed that when the workplace management mandated the use of Windows computers, intention to use declined as evidenced by lower voluntariness of use scores. Among those in the agriculture domain, using Facebook on one's own volition also drove Facebook use because it follows organically from the nature of the farming enterprise. Farmers are essentially self-employed workers, and decisions to use certain tools are entirely self-determined.

Performance expectancy exerted the second greatest influence on intent to use, a finding that echoes those of the studies referenced by Venkatesh et al. (2003) when they created the UTAUT model. The more people saw Facebook as a viable and useful tool for information seeking and exchange, intention to use intensified. Females showed a stronger intention to use, perhaps suggesting women's expanding role in the search and exchange of information as partners in the farming business.

Regression findings also highlight that social influence had a statistically significant influence on intention to use, suggesting that, similar to the general population, the channel use of those who reside in rural communities is very much influenced by their peers. This peer influence is likely to be sparked by the greater need to communicate with others that goes with major farming events such as planting and harvesting.

The regression results also show that intent to use, experience with Facebook, perceived media richness, and perceived personal network (principal component 2), played significant roles in people's use of Facebook. Of these four variables, experience had the greatest influence on

use, indicating that those who have used Facebook for 3+ years were more likely to continue to use it than those who have used it only for 1-2 years. Many of the works cited by Venkatesh et al. (2003) used experience as a moderator, but in the present study, experience did not exert a significant impact when used as such. This suggests that those in agriculture are more likely to use Facebook if they have spent more time with it, lending support to technology acceptance theory, which posits that using technology re-shapes people's reactions to technology use, which can lead to greater technology use.

As expected, the regression findings also show that actual use increases with greater intention to use. In short, those who plan to use it are more likely to use Facebook.

Perceived personal network (principal component 2) is made up of the items PN1 (Most of my friends are using Facebook) and PN2 (I have known the people in my Facebook networks for a long time). These two items combined exerted a significant sway on Facebook use, which indicates the strong ability of one's network of peers to goad friends to use Facebook. Lin and Lu (2011) observed the same result in their study of network externalities, finding that the number of friends and fulfilling interactions on social networking sites contributed toward their persistent use. The present finding points to Facebook as a potent force in strengthening the bonds in agriculture communities.

Perceived media richness had the fourth greatest influence on use, which follows the findings of Lan and Sie (2010) who compared the effectiveness of SMS (text messages), RSS feeds, and emails on mobile learning. In a nutshell, those who think Facebook can deliver their messages quickly and accurately are likely to use it more. This finding suggests that the farming community sees the enhanced ability to ask questions or reach someone in a timely fashion and with accuracy as an asset.

RQ2: What do farmers use Facebook for and to what extent do they use it to seek information about their farming enterprise?

Performing a textual analysis of mined Facebook data provided insights into the types of information farmers seek and gain when they use Facebook. The results show that farmers searched for information that mainly fell under three domains: animals, finances, and crops. Assigning importance to words using tf-idf scores, combined with word and bigram frequencies, sketched the important sub-areas within each of these domains that Facebook users searched for. Bigram tf-idf scores were not included. Due to the high frequency of unique bigrams, the scores were equal for almost all terms in each domain, resulting in no differentiation for importance.

Within the animals domain, tf-idf scores showed the high importance of the words "dog," "sheep," and other terms that involve the breeding and training of animals. Word frequencies were also reviewed because tf-idf scores can sometimes punish high frequency words and diminish their importance. Words that did not receive high tf-idf scores in the animals domain but had high frequencies include "video," "hors" (horse/horses), and "feed." The frequent occurrence of "video" suggests that people are looking for an interactive information component because videos are richer formats that Facebook fully supports. "Hors" goes with the large number of horse-related Facebook pages that were mined. "Feed" also refers to feeding, feeds, and feeders. The bigrams in this domain align with the word frequency results. The bigrams "24 7" and "6 month" also suggest that the time element is crucial when taking care of animals, especially considering the aspect of their year-round care. Some important sub-areas under this domain include breeding, training, and nutrition.

The words "price" and "locat" (location/located) were both defining terms for the finance domain and the most frequently used words in this particular domain. A person interested in

buying something would naturally like to know how much it costs and where it can be purchased. “Iso,” an Internet term that stands for “in search of,” registered a high tf-idf score and was also frequently used. Many Facebook pages about trading, buying, and selling specific items in central Illinois were mined. The bigram network showed the most common items being searched for, such as bales of hay and horses. Price negotiations were also posted, suggesting the importance of finding a good deal for products and services in nearby areas. Some important sub-areas under this domain include the location of the items, the distance between the farmer and the source, and price negotiations.

The words “plant,” “crop,” “tree,” and “soil” were some of the most frequently used to define the crops domain. Other terms used included “fertil,” and “ideotyp,” which also appeared as part of bigrams such as “crop ideotyp” (ideotype), “synthet fertil” (synthetic fertilizer), and “cover crop.” A crop ideotype is defined as “a plant model which is expected to yield a greater quantity or quality of grain, oil or other useful product when developed as a cultivar” (Donald, 1968, p. 389). The use of these terms suggests important sub-areas around plant breeding. The use of synthetic fertilizer and cover crops hints at important sub-areas around crop and soil management. “Crop” also had connections in the bigram network to “GMO,” which continues to be a controversial topic both in the production and consumption aspects of the agriculture industry.

The farm tech and energy domains received the smallest amounts of data, which indicates that Facebook users searched infrequently for these domains and that these topics were rarely discussed on Facebook. Overall, content analysis results mimicked the most recognizable aspects of agriculture—animal raising, costs associated with farming, and the growing of crops.

Several factors affect the extent to which farmers use Facebook to find these information domains. These were determined by conducting another round of regression tests. The results show that beliefs (principal components 1 and 2), channel characteristics, and salience (principal component 1) played significant roles in people's evaluations of the ability of Facebook to provide agricultural information. Beliefs demonstrated the greatest influence, with a positive impact on channel utility. According to Johnson et al. (1995), "The question individuals pose to themselves here is: Can I do something?" (p. 280). If the respondents think that information from Facebook will help them in their tasks, then their faith on Facebook as an ally in the fulfillment of those tasks is strengthened.

Channel characteristics also had a strong positive influence on channel utility. The way information is presented affect individuals' perceptions of the credibility of an information source (Johnson et al., 1995). The present study's results confirmed this assertion. The study found that the value people attach to Facebook increases as their perceptions of Facebook's utility and credibility increases.

The extent to which a communication medium is salient to people's lives displayed the third greatest influence on channel utility, although it played a slightly negative role. In this case, the data showed that people's "underlying motivating force to seek information" (Johnson et al., 1995, p. 279) resulted in a decrease in how much value they attach to Facebook as a source of agricultural information. This counter-intuitive result suggests that respondents hold Facebook to high information standards, but publicized incidences of privacy violations and personal data infringements may have rendered the respondents skeptical about its usefulness even if the need for information remained high.

The regression results for information seeking actions (principal components 1 and 2) suggest that channel utility played a positive role in the ways that people seek agriculture information on Facebook. This means that Facebook users are likely to take various information seeking actions if they think that Facebook can supply such information. Channel characteristics, though, was not a statistically significant determinant of information seeking, suggesting that the perceived credibility and utility of the platform may have mediated the courses of action people take to find information on Facebook.

RQ3: What needs are answered and what gratifications are derived from farmers' use of Facebook?

The gratifications sought (GS) and obtained (GO) reported by the respondents provided insights into some important aspects of Facebook use. Correlations between the GS and GO items were mostly strong and positive, indicating that in general, those who use Facebook for various GS reasons (GS) were obtaining a similarly close level of gratifications (GO) from that use. According to Palmgreen et al. (1980), these results are "evidence against the teleological criticism that since a gratification is sought, it must necessarily be obtained" (p. 183). The categories of general information seeking and decisional utility had the highest average correlations, which aligns with the strong influence of channel characteristics on channel utility from CMIS, and the strong influence of channel utility on information seeking actions also from the CMIS analysis. The entertainment category had the lowest average correlation, which suggests that farmers resort to Facebook for more critical needs such as finding useful information, instead of the need to be entertained.

The results produced three components from PCA for GS and GO items as shown in Table 22. For GS items, information utility was the term assigned to principal component 1 because the items dealt with both general information seeking and decisional utility. Principal component 2 centered on interpersonal utility, and principal component 3 focused on entertainment. The parasocial interaction items ended up splitting into each component; thus, it failed to show up as an individual category of need. This suggests that as people turn to Facebook to seek gratifications, they do so not solely to be able to communicate with others online; other needs are also being fulfilled with Facebook use. In other words, parasocial interactions fulfill both information and entertainment needs.

For the GO items, information-interpersonal utility was the term assigned to principal component 1 because the items were composed of general information seeking, decisional utility, and interpersonal utility. Parasocial utility was the term assigned to principal component 2 because the items were a combination of parasocial interaction, interpersonal utility, and decisional utility. Principal component 3 was about entertainment. Here, parasocial interaction emerges as a type of gratification obtained even when not originally observed as a distinctly separate gratification. This suggests that those who were looking for information were successful in obtaining such information. It also means they were obtaining a distinguishable level of online interaction with people as a possible side-effect of using Facebook. Also, the entertainment category appeared separate from the others, suggesting that the entertainment needs of those using Facebook do not cross into other areas of GS or GO.

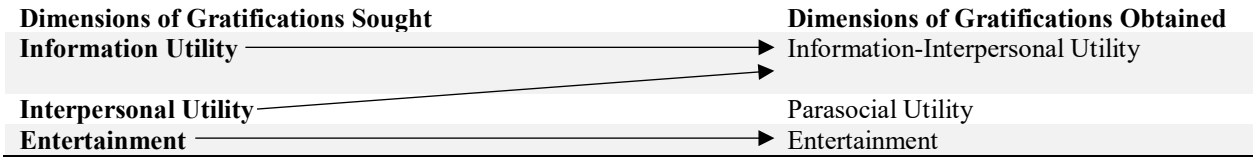

Figure 25: Gratifications sought and obtained from the current study

Correlations between demographic characteristics and the principal component groups provided insight into the relationships between Facebook experiences and the GS and GO items. The first demographic variable, how often people use Facebook, had a weak but positive relationship with all components, except GS PC3 and GO PC3 (the entertainment categories). This suggests that those who use Facebook more had slightly stronger information needs than those who do not use Facebook as much. The second demographic variable, how people rated their current social media skills, had weak positive relationships with all GS and GO components. This implies that those who see themselves as being more skilled at using social media in general have a stronger need to use Facebook. The third demographic variable asked if people posted questions about agriculture on Facebook. The results showed a weak negative relationship for GS PC1 (information utility), GS PC2 (interpersonal utility), and GO PC1 (information-interpersonal utility). These findings were congruent with the CMIS result that saw salience displaying a negative influence on channel utility. This suggests that people who post questions as a direct method of information seeking have a stronger need to find answers to those inquiries and may hold Facebook's ability to provide such answers to a higher standard. The last two demographic questions had respondents rate the helpfulness of Facebook's agriculture content. The results show weak but positive relationships with GS PC1 (information utility), GO PC1 (information-interpersonal utility), and GO PC2 (parasocial utility). These results indicate that those with stronger information needs perceived the public and group Facebook pages to be more helpful, and the gratifications they got out of using those resources resulted in getting the information they needed, but with the added benefit of being in communication with others. This also aligns with the parasocial utility category emerging as a GO group as previously discussed.

Summary of Conclusions

In summary, the survey results showed that those who see Facebook as a viable tool for information seeking and exchange, those who see it as available for their voluntary use, those who abide by the influence and recommendations of their peers, and females are more likely to accept Facebook for agriculture purposes. Who are the most likely to use this platform? Regression results indicate that those who are more accepting of the technology, those who see Facebook as a rich medium of communication, and those who have significant personal relationships online have a higher propensity to use this social media platform. Those with little experience with it are likely to eschew Facebook use. These results provide evidence that the UTAUT items the present study added to the original proposition—perceived media richness and perceived personal network—enhanced the validity of the model.

The results show, however, the limited ability of the UTAUT and CMIS models to predict Facebook adoption and use. With respect to the UTAUT model, effort expectancy, age, facilitating conditions, and all interactions between moderators and constructs, were not found to be statistically significant predictors. Because UTAUT involves interactions between all constructs and moderators, the adjusted R-square value is reduced each time a new term is added to the model, and the VIF scores for items increase (demonstrating a problem with multicollinearity). Thus, as more terms are added to the model, interpretability decreases, despite slight increases to the R-square value. It is important to note that UTAUT was formulated to explain intention to use technology before the advent of social media. Today, internet access is much more ubiquitous, making it is easier to interact online. Effort expectancy, age, and facilitating conditions were not found to be statistically significant predictors in this study, indicating that people's ways of choosing a technology may also be changing and that the model

may need to be re-worked. The success of the two added moderators (perceived media richness and perceived personal network) suggests two viable modifications so that the model can accommodate changes in how people select a technology to use.

With respect to the CMIS model, the present study found that demographics, direct experience, and principal components 2 and 3 of salience were not statistically significant predictors of channel utility, and that channel characteristics was not a significant determinant of information seeking actions. Due to the smaller number of variables in this model, adjusted R-square values and VIF scores were not major concerns compared with UTAUT. CMIS did well in identifying the predictors of channel utility, but the demographic variables age, gender, and education, length of time in agriculture, area of agriculture worked, and farming income, were found to be non-significant predictors. Principal components 2 and 3 of salience had items that dealt with the extent to which those in the agriculture community are dependent on others to do their job. These results attest to the ubiquity of Facebook as a platform used by people of different ages and in a variety of career areas, rendering these items non-significant. The results pertaining to the principal component 2 of salience suggest that people's attitudes toward the agriculture community had no bearing on their ability to use Facebook for agricultural information seeking.

Channel characteristics did not influence information seeking actions, but most likely had a mediating effect on channel utility. Based on the results of the UTAUT and U&G analyses, Facebook use (and, by extension, information seeking actions) was affected by more than just perceptions of Facebook's ability to provide what users were looking for. This suggests that social influences and technical platform characteristics may have a substantial impact on Facebook use.

Examining information seeking patterns through a content analysis of postings in public and group Facebook pages showed that animals, finance, and crops were the major domains about which information were sought by Facebook users. Important sub-areas within these domains also were identified. Beliefs and channel characteristics contributed positively to the perceived channel utility of Facebook among the respondents. Salience had a negative effect on perceived utility as respondents' increased need for information went in tandem with a certain level of skepticism about Facebook's ability to provide that information. Statistical analysis uncovered positive and strong relationships between gratifications sought (GS) and gratifications obtained (GO) items. The three most frequently observed GS categories were information utility, interpersonal utility, and entertainment. The three most prominent GO categories were information-interpersonal utility, parasocial utility, and entertainment. These results suggest that the farming population seek and obtain gratifications from Facebook beyond those that are related to strictly figuring out how to solve problems in the farming enterprise. For example, some Facebook pages were dedicated to funny mishaps on the job, while some featured humorous discussions on the benefits of raising chickens. Other pages exclusively discussed the well-being of animals, while some followed national or community events, offered advice on how to teach agriculture in schools, or explained farming to those outside the industry.

From a practical standpoint, communication strategists and information managers can use the findings of the present study to pinpoint the factors that have a bearing on the acceptance and use of other information-communication technologies such as mobile phone apps and other interactive software that can improve the exchange of agricultural information, including new practices and innovations. Knowing the gratifications that members of the agriculture community seek and obtain from Facebook can help expand the reach of government agencies, non-

government organizations, and other entities with a mandate to provide the farming community with information they need in a timely fashion. The way the Facebook platform presents information will continually evolve, and so will the agriculture community's way of seeking information. Understanding the motivations behind Facebook use—and the types of information people search for when they actively use Facebook—can foster stronger online bonds between government, industry and the farming community.

Limitations of the Study

The generalizability of the findings is limited by the fact that the study was not able to gather time series data to track changes in the constructs over time. A time series analysis would have provided stronger statements of causality.

The non-random sample was limited to those who reside in Illinois, which may not be representative of the general United States farming population. The analysis was also confined to only one set of data collected from one group of agriculture industry respondents, which makes the findings susceptible to validity risks. Thus, validity analysis was performed with results presented to demonstrate the viability of the modified model.

History was also a threat to validity, due to the issue surrounding users' information privacy on Facebook regarding the Cambridge Analytica event in March of 2018. It is possible users' feelings about Facebook's credibility may have been affected by this event, since the survey was first distributed in December of 2018 and the concerns were still discussed in the news. Appendix E provides examples of email comments received regarding the survey, most of which dealt with privacy concerns.

Recommendations for Future Work

Four suggestions for future work emerge. First, the literature in the field can be expanded by studies that could test the validity of the modified UTAUT model and the original CMIS approach beyond Facebook into other social media platforms such as Instagram and YouTube, which are increasingly becoming popular. Although Facebook is still the leading social media across the globe, YouTube is the second most popular social media platform and is being frequently used in the agriculture industry and in rural areas. Examining the adoption and use of other social media platforms could provide insights into how information is being sought and how inquiries are posed. Then, the analysis could branch into how discussion threads evolve. Such an omnibus analysis of social media outlets can also identify the sentiments people in agriculture may have toward certain topics based on the way they participate in online discussions.

Second, as another expansion to this study, evaluating the decision-making process by the people in charge of making the decision may pose a difference in the level of participation one has with Facebook. This could also impact the type of questions being asked online and the information being sought after.

Third, examining YouTube use, which focuses on video and audio content rather than predominantly textual and photographic content, offers more comparative discernments about the nature of information seeking, which was focused on social networking in the case of Facebook.

Fourth, a more in-depth discourse analysis of Facebook posts will enable the gathering of rich and deep data that can range from public to private language use, official to colloquial rhetoric, and from oratory to written and multimedia discourses. Such a qualitative analysis will

be able to perceive and categorize various meaning-making processes, networks and practices from social media data. Discourse analysis can also help researchers examine the art of persuasion evident in the texts and take into account their social and cultural contexts.

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APPENDIX A: IRB APPROVAL LETTERS

ILLINOIS

OFFICE OF THE VICE CHANCELLOR FOR RESEARCH

Office for the Protection of Research Subjects
805 W. Pennsylvania Ave., MC-095
Urbana, IL 61801-4822

Notice of Approval: New Submission

November 12, 2018

Principal Investigator	Ma Lulu Rodriguez
CC	Jarai Carter
Protocol Title	*Use of and Information Seeking Behaviors on Facebook among Illinois Farmers and Farm Families*
Protocol Number	19283
Funding Source	Unfunded
Review Type	Exempt 2
Status	Active
Risk Determination	No more than minimal risk
Approval Date	11/12/2018

This letter authorizes the use of human subjects in the above protocol. The University of Illinois at Urbana-Champaign Institutional Review Board (IRB) has reviewed and approved the research study as described.

Exempt protocols are approved for a five year period from their original approval date, after which they will be closed and archived. Researchers may contact our office if the study will continue past five years.

The Principal Investigator of this study is reponsible for:

- Conducting research in a manner consistent with the requirements of the University and federal regulations found at 45 CFR 46.
- Requesting approval from the IRB prior to implementing modifications.
- Notifying OPRS of any problems involving human subjects, including unanticipated events, participant complaints, or protocol deviations.
- Notifying OPRS of the completion of the study.

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN
IORG0000014 • FWA #00008584
217.333.2670 • irb@illinois.edu • oprs.research.illinois.edu

Figure 26: IRB approval letter

ILLINOIS

OFFICE OF THE VICE CHANCELLOR FOR RESEARCH

Office for the Protection of Research Subjects
805 W. Pennsylvania Ave., MC-095
Urbana, IL 61801-4822

Notice of Approval: Amendment 1

December 11, 2018

Principal Investigator	Lulu Rodriguez
CC	Jarai Carter
Protocol Title	*Use of and Information Seeking Behaviors on Facebook among Illinois Farmers and Farm Families*
Protocol Number	19283
Funding Source	Unfunded
Review Type	Exempt 2
Amendment Requested	• Adding additional data collection sites • Revising recruitment statements • Revising survey
Status	Active
Risk Determination	No more than minimal risk
Approval Date	12/11/2018

This letter authorizes the use of human subjects in the above protocol. The University of Illinois at Urbana-Champaign Institutional Review Board (IRB) has reviewed and approved the research study as described.

Exempt protocols are approved for a five year period from their original approval date, after which they will be closed and archived. Researchers may contact our office if the study will continue past five years.

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- Requesting approval from the IRB prior to implementing modifications.
- Notifying OPRS of any problems involving human subjects, including unanticipated events, participant complaints, or protocol deviations.
- Notifying OPRS of the completion of the study.

Figure 27: IRB amendment approval letter

APPENDIX B: THE STUDY QUESTIONNAIRE

USE OF AND INFORMATION SEEKING BEHAVIORS ON FACEBOOK AMONG ILLINOIS FARMERS AND FARM FAMILIES

(1) Survey Eligibility

1. Do you work in the agriculture industry?
   - Yes, I work in the agriculture industry. [Please go to Q2]
   - No, I do not work in the agriculture industry. [Please exit survey]
2. Have you used Facebook for agriculture reasons before?
   - Yes, I have used Facebook for agriculture reasons before. [Please go to Section 2]
   - No, I have never used Facebook for agriculture reasons. [Please go to Q3]
3. If you have not used Facebook for agriculture purposes, what are your reasons for not doing so? Below, please write them down below. [Exit survey after submission]

Please indicate the degree to which you agree with each of the following statements on a seven-point scale where 1 means *strongly disagree* and 7 means *strongly agree*. Please read each item carefully.

(2) Acceptance of Facebook

Performance Expectancy

1. In general, I find Facebook useful.
2. Using Facebook enables me to accomplish my tasks quickly.
3. Using Facebook increases my productivity.
4. I can use Facebook wherever I am.

Effort Expectancy

5. Facebook clearly shows how I can interact with people.
6. Facebook takes too much time from normal routines.
7. Learning to operate Facebook is easy for me.

Social Influence

8. I consider myself trendy because I use Facebook.
9. Most people who influence my behavior think that I should use Facebook.
10. Most people who are important to me think that I should use Facebook.

Facilitating Conditions

11. I have the Internet access necessary to use Facebook.
12. I have the computer knowledge necessary to use Facebook.
13. Facebook is not compatible with other communication technologies I use.
14. Most people I know can help me with any problems I encounter using Facebook.

Voluntariness of Use

15. Whether I should us Facebook is entirely up to me.

Behavioral Intention to Use

16. I intend to use Facebook in the next six months.

Use Behavior

17. I use Facebook daily.
18. I use Facebook weekly.
19. I use Facebook monthly.

Perceived Media Richness

20. Facebook allows me to give and receive information in a timely fashion.
21. Facebook allows me to tailor the messages I send through it.
22. I am able to communicate a variety of emotions and attitudes on Facebook.
23. A wide range of supporting tools (e.g., photo and message sharing, video sharing) are available on Facebook.
24. I can join a wide range of social activities on Facebook (e.g., fan pages, quizzes).

Perceived Personal Network

25. Most of my friends are using Facebook.
26. I have known the people in my Facebook networks for a long time.
27. Most people in my Facebook networks live far away.
28. Most people in my Facebook networks have interests that are similar to mine.
29. Most people in my Facebook networks are friends with each other.

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(3) Information Seeking Behaviors on Facebook

Salience

30. I gain confidence when I am informed more about agriculture.
31. It is important for me to keep up with the latest agriculture information.
32. Having more agriculture information helps me make better decisions.
33. I can freely express my thoughts about agriculture on Facebook.
34. I really like the agriculture community on Facebook.
35. My work is highly related with the work of those in my Facebook networks.
36. A lot of people are affected by how well I perform my job.
37. I can decide for myself how my work should be done.
38. I do not need the assistance of others to do my job.

Beliefs

39. It is pointless to communicate using Facebook since no one reads or pays attention to what most people post anyway.
40. Nothing ever happens when I communicate using Facebook.

41. If I encounter an agriculture problem, most individuals in the Facebook agriculture community help by sharing information.
42. I get agriculture information on Facebook that is helpful to me.
43. Facebook has the ability to meet most of my agriculture information needs.
44. By using Facebook, I can help the agriculture industry better serve the public.
45. By using Facebook, I can help the agriculture industry inform the public.
46. By using Facebook, I can help people in other areas of agriculture do their jobs better.
47. By using Facebook, I can develop teams to tackle specific problems within the agriculture industry.

Channel Characteristics

48. I find the information about agriculture on Facebook accurate.
49. I find the information about agriculture on Facebook well-intentioned.
50. I find the information about agriculture on Facebook very understandable.
51. I find the information about agriculture on Facebook clearly presented.

Channel Utility

52. Facebook is important to me because it helps me find information about agriculture.
53. It is easy to get agriculture information on Facebook.
54. Facebook is a valuable source of agriculture information.

Actions

55. I send a lot of messages about agriculture on Facebook.
56. I talk to a lot of people about agriculture on Facebook.
57. I use Facebook to obtain others' opinions about agriculture.
58. I use Facebook to find solutions to agriculture problems.
59. I use Facebook to get updates or news about agriculture.
60. I use Facebook to find background information about agriculture.
61. I use Facebook to help make agriculture-related purchase decisions.
62. I seek agriculture information on Facebook only when I need to.

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(4) Demographics

1. Are you a member of an Illinois County Farm Bureau?
   Yes, I am a member.
   No, I am not a member.
2. If yes, what Illinois County Farm Bureau are you a member of? Please select from the menu below.
3. What gender do you identify with?
   Male Female Other
4. Under which age bracket do you belong?
   18-21 22-25 26-30 31-40 41-50 51-60 61 or over

5. What is your race?
American Indian/Alaska Native Asian Black/African American
Native Hawaiian/Other Pacific Islander White Two or more races Other
6. What is your ethnicity?
Hispanic/Latino Not Hispanic/Latino
7. What type of area do you live in?
Rural Suburban Urban
8. What is the highest level of education you completed?
Did not complete high school High School graduate/GED certificate Some college
2-year college degree 4-year college degree Master's degree Doctoral degree
Professional degree
9. How long have you worked in the agriculture industry?
Less than 1 year 1-5 years 6-10 years 11-15 years 16-20 years
More than 20 years
10. What was your total household income in 2017?
None Less than $19,999 $20,000-$39,999 $40,000-$59,999 $60,000-$79,999
$80,000-$99,999 Over $100,000
11. What category best describes the area of agriculture you work in?
Agri-business Agricultural communications Agricultural education/extension
Agricultural engineering Agronomy/Soils Animal science/Veterinary medicine
Farming (animals) Farming (plants) Food science/Human nutrition
Insects and entomology Landscaping & turf Plant science/breeding
Natural resources/Environmental sciences Other____
12. What was the total income you received from farming in 2017?
$0 - $999 $1,000 - $9,999 $10,000 - $99,999 $100,000 - $249,999 Over $249,999

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(5) Facebook and Social Media Habits

1. How long have you used Facebook?
Less than 6 months 6 – 11 months 1-2 years 3+ years
2. How often do you use Facebook?
A few times a month or less Once a week Every day or two Several times a day
3. How long have you used social media (including Facebook)?
Less than 6 months 6 – 11 months 1-2 years 3+ years
4. How often do you use other social media (not including Facebook)?
Never A few times a month or less Once a week Every day or two
Several times a day
5. How would you rate your current social media skills?
Poor Fair Good Very good Excellent
6. Aside from Facebook, what other social media sites do you use? Please check all that apply.
Instagram Pinterest LinkedIn Twitter YouTube Reddit Tumblr Flickr
Google+ Snapchat WhatsApp WeChat LINE Viber
7. Which devices do you use to check social media? Please check all that apply.
Computer (Laptop/Desktop) Cell phone/Smartphone Tablet (iPad, Kindle) Other____

8. Where do you access social media?

Home Work School Other public location (for example: library, restaurant)____

9. Aside from Facebook, what other social media do you use to seek agriculture information? Please check all that apply.

Instagram Pinterest LinkedIn Twitter YouTube Reddit Tumblr Flickr Google+ Snapchat WhatsApp WeChat LINE Viber

10. Do you post questions about agriculture on Facebook?

Yes, I post questions about agriculture on Facebook.

No, I do not post questions about agriculture on Facebook. [Please go to Q12.]

11. If yes, where do you post questions about agriculture on Facebook?

In my status updates In a group On a page Other____

12. The following are types of content you find on Facebook. How helpful are each of them in providing you with agriculture information? Please rate each type of content on a five-point scale where 1 means *not at all helpful* and 5 means *extremely helpful*. Please select *not applicable (N/A)* if you have not used a particular content type.

Advertisements Apps Articles Events Groups Links Pages Photos Places Related searches Status updates Videos

13. Please list up to five agriculture-focused public *groups* on Facebook of which you are a member. Please provide direct links, if possible.
14. Please list up to five agriculture-focused public *pages* on Facebook that you have *liked* before. Please provide direct links, if possible.
15. Please list up to five agriculture-focused *topics* or *items* you have searched for on Facebook.

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(6) Gratifications Sought and Obtained

The following are 15 reasons why people use Facebook. To what extent does each reason apply to you? Please indicate your responses on a seven-point scale where 1 means *strongly disagree* and 7 means *strongly agree*.

General Information Seeking

1. I use Facebook to keep up with current issues and events.
2. I use Facebook because I trust the information it gives.
3. I use Facebook because it offers so much information about agriculture that I can use.

Decisional Utility

4. I use Facebook to monitor what government officials are doing.
5. I use Facebook to help me determine the important issues of the day.
6. I use Facebook to find out about issues affecting people like myself.

Entertainment

7. I use Facebook because it's often entertaining.
8. I use Facebook because it's often dramatic.
9. I use Facebook because it's often exciting.

Interpersonal Utility
10. I use Facebook to find information and opinions that support my own viewpoints.
11. I use Facebook so I can pass information along.
12. I use Facebook to learn about interesting topics that I can talk about with others.

Parasocial Interaction
13. I use Facebook because it gives a human quality to the news.
14. I use Facebook to compare my own ideas with those of others.
15. I use Facebook because I like interacting with people I know.

Now we would like to know to what extent using Facebook actually provides you with some of the services and functions listed above. Please tell us how much each of the following statements apply to you using a seven-point scale where 1 means *strongly disagree* and 7 means *strongly agree*.

General Information Seeking
1. Using Facebook helps me keep up with current issues and events.
2. My Facebook network gives me trustworthy information.
3. Facebook offers so much information about agriculture that I can use.

Decisional Utility
4. Facebook helps me monitor what government officials are doing.
5. Facebook helps me make up my mind about the important issues of the day.
6. Facebook helps me find out about issues affecting people like myself.

Entertainment
7. Facebook content is often entertaining.
8. Facebook content is often dramatic.
9. Facebook content is often exciting.

Interpersonal Utility
10. Facebook helps me find information and opinions that support my own viewpoints.
11. Facebook helps me pass information along.
12. Facebook gives me interesting topics to talk about with others.

Parasocial Interaction
13. Facebook gives a human quality to the news.
14. Facebook allows me to compare my own ideas with those of others.
15. Facebook allows me to interact with people I know.

Note: The gratifications sought and obtained scales should be ordered randomly and the category headings should be removed before administering.

(7) Survey Exit Message

Thank you for participating in this survey.
If you completed the questionnaire and would like to be entered into a random drawing for a $50 Amazon.com gift card, click here to go to a separate page to let us know your contact information (name, email address, and phone number). Any information you provide will not be connected in any way to your responses. Within 24 hours after the survey closes, the winners will be contacted, and arrangements will be made to have the gift card picked up or mailed to them.

APPENDIX C: LIST OF FACEBOOK GROUPS AND PAGES

Table 22: Facebook groups mined and number of members as of March 2019

Group Name	Members
BYC (BackYardChickens)	153,005
My Job Depends On Ag	83,853
OTTB CONNECT	73,575
OTTBs looking for second careers	25,102
I am Agriculture Proud	17,115
Southern Illinois Horses & Horse Related Sales	9,104
Registered Dairy Cattle Classified	8,857
Food & Farm Discussion Lab Forum	7,235
"Northern" Illinois Horses Etc.	5,341
Illinois Sheep & Goats.	4,740
Herding Dogs - Trials, Competitions & Clinics	4,525
The Allis Chalmers WD and WD45 page,	4,435
Waygu Breeders Group	4,335
How to train your sheepdog	4,171
Missouri Beekeepers	4,117
Pike County IL Agricultural buy sell trade	1,888
Southern Illinois Farm Barter Community	1,700
Central IL Farm Traders	1,617
Dairy Challenge Alumni	748
Women in Agriculture Business Classifieds	669
Illinois Meat Goat Producers	516
Wisconsin Hay Exchange	467
PrairiErth Farm Community Supported Agriculture (CSA)	433
Sheep Color Genetics	339
Illinois Shorthorn Association	315
Food is FREE - Edwardsville/Glen Carbon	280
Central Illinois Homesteaders	252
Crop Sciences Graduate Student Organization	154
Prairieland Beekeepers	108
The Peoria Pollinator Project	104
Central Illinois Stockdog Association	98
Winnebago-Boone Farm Bureau Young Leaders	91
Farm Stuff	87
Sheep Farming Production Models and Financials Group	46
Ogle County Young Leaders	37

Table 23: Facebook pages mined and number of likes as of March 2019

Page Name	Likes
HumaneWatch	500,870
Peterson Farm Bros	432,649
AGCO	338,652
Bayer Crop Science	251,583
Mecum Gone Farmin'	220,496
Machinery Pete	134,102
Pioneer Seeds	126,515
National Cattlemen's Beef Association	109,559
Farming mishaps	100,471
AgHires	81,253
FarmHer	42,758
Successful Farming	41,017
Minnesota Department of Natural Resources	32,546
American Farmland Trust	32,188
Farmer Veteran Coalition	25,801
Illinois Farm Bureau	23,261
GMO Answers	20,482
National Swine Registry	17,213
American Society of Agronomy	15,893
University of Illinois Extension	13,941
Maryland Sheep and Wool Festival	13,781
Farm Journal's PORK	11,561
IL Corn	7,717
Prairie Farmer	6,692
Agri-Pulse Communications	5,806
GROWMARK, Inc.	5,565
Fisher Community Fair	5,174
The Banner Sheep Magazine	4,784
Landmark Services Cooperative	3,895
Galesburg Farmers Market	3,174
Executive Women in Agriculture	2,734
Mid-States Wool Growers	2,140
Fairview Sales Barn	1,884
Knox County Pork Producers Association	1,873
Rural Route Life	1,751
Natural Land Institute	1,724
Fulton County Farm Bureau	1,602
Champaign County Farm Bureau	1,078
NCALL Research, Inc.	1,054

Table 23 (cont.)

Page Name	Likes
Estes Park Wool Market	1,006
Illinois SARE	964
Sangamon County Farm Bureau	936
Montadale Sheep Breeders Association	732
Bureau County Farm Bureau	603
IntelinAir	597
Henry County Farm Bureau	534
Midwest Hemp Council	478
Illinois Nutrient Research & Education Council	461
Maddies chicken shack	386
Champaign County Farm Bureau Young Ag Leaders	334
Wehmeyer Barn Yard	103

APPENDIX D: THE STUDY CODEBOOK

USE OF AND INFORMATION SEEKING BEHAVIORS ON FACEBOOK AMONG ILLINOIS FARMERS AND FARM FAMILIES

Jarai Carter, University of Illinois at Urbana-Champaign

The Study Codebook

Instructions: Each *Facebook group post or comment,* or *Facebook page post or comment,* will be coded with the variables listed in the table below and recorded in the accompanied Excel spreadsheet. For the Com-dom variable, identify which domain the comment best fits in and record the code. Domain descriptions are provided below. If the comment does not fit in one of the selected domains, choose code 11 and write the new domain in parenthesis next to the number. No comment can have more than one code or value in each cell – excluding the use of code 11. Do not consult with anyone, including the other coders, for this process.

Table 24: Variable table for the study codebook

Variable Name	Variable Label	Codes or Values
Coder	Coder's name	1=Coder 1 2=Coder 2
URL	Web address of the post	Enter as a string (no hyperlinks)
Date	Date of the post's publication	Enter as a string in the mm-dd-yyyy format
FB-name	Name of the Facebook page or group that carried the post	Enter as a string
FB-type	Whether the page is a Facebook page or group	1=Page 2=Group
FB-section	Where the post is located on the page or group	1=Community 2=Discussion 3=Posts
Com	A single comment	Enter the whole comment as written as a string
Com-dom	Domain under which the comment falls	1=Crops and Soils 2=Animals 3=Farm Equipment 4=Energy 5=Finance, Economics, and Trade 6=Environment and Natural Resources 7=Farm Technology 8=Communication/Information Technology 9=Family and Community Health/Nutrition 10=Family and Community Affairs 11=Others (specify)

Table 24 (cont.)

Com-type	Whether the comment is a post, a comment on the post, or a reply	1=Post 2=Comment 3=Reply
Notes	Anything of importance to highlight	Enter as a string

Coding Domains

1 Crops and Soils

- This domain includes things related to crops, soils, agronomy, seeds, large and small-scale production of food, and management methods for crops and soils.

2 Animals

- This domain includes things related to animals, including activism/wellbeing, events and shows, management methods, animal products (ex: milk, wool), and specific kinds.

3 Farm Equipment

- This domain includes things related to farm equipment, machinery, vehicles and tools.

4 Energy

- This domain includes things related to energy use and consumption, such as electricity, water power, wind power, and gasoline.

5 Finance, Economics, and Trade

- This domain includes things related to finance, economics, trade, tariffs, taxes, buying, selling, and costs.

6 Environment and Natural Resources

- This domain includes things related to climate and weather, conservation, natural disasters, sustainability, and emissions.

7 Farm Technology

- This domain includes things related to agriculture technologies at a broad level, including digital or computer-based items and science-based items.

8 Communication/Information Technology

- This domain includes things related to news and media outlets, communication mediums, and social media.

9 Family and Community Health/Nutrition

- This domain includes things related to human physical and mental wellbeing, health services, sickness and disease, foods/diets, food preparation, and nourishment.

10 Family and Community Affairs

- This domain includes things related to government programs, efforts to educate public audiences, higher-education programs, and youth organizations (ex: FFA, 4-H).

11 Others (specify)

- This domain includes things that do not fall into another domain. The new domain should be specified.

APPENDIX E: WHY PEOPLE DO NOT USE FACEBOOK: INSIGHTS FROM SURVEY COMMENTS

Dear Sir, I use Facebook, but only occasionally and I don't want to give out any more info than those ******** already have. so no I will not answer your survey. I will allow you permission to use my info and I am seriously considering dropping my" commie" Facebook page.
thank God I have Lifelock because the ******** have already probabaly compromised my information. Good day...

I am a landowner and retired. I do not use facebook because of their security issues and political stance. I would not recommend it to anyone.

The following links back up my stance.

As Facebook Raised a Privacy Wall, It Carved an Opening for Tech Giants

Report: Facebook Let Netflix and Spotify Read Users' Private Messages | Breitbart

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Sorry, I don't think I fit you needs. Im 75 years old and only two days ago I accepted my wife's older i phone. Im still fooling around with it. It seems to have more answers than I have questions. I do use Google daily and i know thats accessible with the phone. Also I have never used Face Book.

I entered the survey but I don't work in the Ag industry. We own land and rent it out to a local farmer. My wife is an avid facebook user and I am not. The simple reason is privacy and what they do with the info that is mine. There is a series of articles on this subject in a recent issue (January) of Time that describes the problem. I choose not to mindlessly give them access to all my personal information. You should read the articles for more insight.
